PG No. 19 C_{3v} $3m$ (3m1 setting) [trigonal] (jml basis)

bra: $= \langle \frac{1}{2}, \frac{1}{2}; s| \, , \langle \frac{1}{2}, -\frac{1}{2}; s|$
ket: $= |\frac{1}{2}, \frac{1}{2}; s\rangle \, , |\frac{1}{2}, -\frac{1}{2}; s\rangle$

Table 1: (s,s) block.

No.	multipole	matrix
1	symmetry	1
	$\mathbb{Q}_0^{(a)}(A_1)$	$\begin{bmatrix} \frac{\sqrt{2}}{2} & 0 \\ 0 & \frac{\sqrt{2}}{2} \end{bmatrix}$
2	symmetry	z
	$\mathbb{M}_1^{(1,-1;a)}(A_2)$	$\begin{bmatrix} \frac{\sqrt{2}}{2} & 0 \\ 0 & -\frac{\sqrt{2}}{2} \end{bmatrix}$
3	symmetry	$-y$
	$\mathbb{M}_{1,1}^{(1,-1;a)}(E)$	$\begin{bmatrix} 0 & \frac{\sqrt{2}i}{2} \\ -\frac{\sqrt{2}i}{2} & 0 \end{bmatrix}$
4	symmetry	x
	$\mathbb{M}_{1,2}^{(1,-1;a)}(E)$	$\begin{bmatrix} 0 & \frac{\sqrt{2}}{2} \\ \frac{\sqrt{2}}{2} & 0 \end{bmatrix}$

bra: $= \langle \frac{1}{2}, \frac{1}{2}; s| \, , \langle \frac{1}{2}, -\frac{1}{2}; s|$
ket: $= |\frac{1}{2}, \frac{1}{2}; p\rangle \, , |\frac{1}{2}, -\frac{1}{2}; p\rangle \, , |\frac{3}{2}, \frac{3}{2}; p\rangle \, , |\frac{3}{2}, \frac{1}{2}; p\rangle \, , |\frac{3}{2}, -\frac{1}{2}; p\rangle \, , |\frac{3}{2}, -\frac{3}{2}; p\rangle$

Table 2: (s,p) block.

No.	multipole	matrix
5	symmetry	z
	$\mathbb{Q}_1^{(a)}(A_1)$	$\begin{bmatrix} -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & \frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \end{bmatrix}$
6	symmetry	x
	$\mathbb{Q}_{1,1}^{(a)}(E)$	$\begin{bmatrix} 0 & -\frac{\sqrt{3}}{6} & -\frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{6}}{12} & 0 \\ -\frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{2}}{4} \end{bmatrix}$

continued ...

Table 2

No.	multipole	matrix
7	symmetry	y
	$\mathbb{Q}_{1,2}^{(a)}(E)$	$\begin{bmatrix} 0 & \frac{\sqrt{3}i}{6} & -\frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{6}i}{12} & 0 \\ -\frac{\sqrt{3}i}{6} & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & -\frac{\sqrt{2}i}{4} \end{bmatrix}$
8	symmetry	z
	$\mathbb{Q}_{1}^{(1,0;a)}(A_1)$	$\begin{bmatrix} \frac{\sqrt{6}}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \end{bmatrix}$
9	symmetry	x
	$\mathbb{Q}_{1,1}^{(1,0;a)}(E)$	$\begin{bmatrix} 0 & \frac{\sqrt{6}}{6} & -\frac{1}{4} & 0 & \frac{\sqrt{3}}{12} & 0 \\ \frac{\sqrt{6}}{6} & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & \frac{1}{4} \end{bmatrix}$
10	symmetry	y
	$\mathbb{Q}_{1,2}^{(1,0;a)}(E)$	$\begin{bmatrix} 0 & -\frac{\sqrt{6}i}{6} & -\frac{i}{4} & 0 & -\frac{\sqrt{3}i}{12} & 0 \\ \frac{\sqrt{6}i}{6} & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & -\frac{i}{4} \end{bmatrix}$
11	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{G}_{2}^{(1,-1;a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{i}{2} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{i}{2} & 0 \end{bmatrix}$
12	symmetry	$\sqrt{3}yz$
	$\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & \frac{1}{4} & 0 & \frac{\sqrt{3}}{4} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{4} & 0 & -\frac{1}{4} \end{bmatrix}$
13	symmetry	$-\sqrt{3}xz$
	$\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & \frac{i}{4} & 0 & -\frac{\sqrt{3}i}{4} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}i}{4} & 0 & \frac{i}{4} \end{bmatrix}$
14	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{i}{2} \\ 0 & 0 & -\frac{i}{2} & 0 & 0 & 0 \end{bmatrix}$
15	symmetry	$-\sqrt{3}xy$
	$\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{1}{2} \\ 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 \end{bmatrix}$
16	symmetry	1

continued ...

Table 2

No.	multipole	matrix
	$\mathbb{G}_0^{(1,1;a)}(A_2)$	$\begin{bmatrix} -\frac{i}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{2} & 0 & 0 & 0 & 0 \end{bmatrix}$
17	symmetry	z
	$\mathbb{T}_1^{(a)}(A_1)$	$\begin{bmatrix} -\frac{\sqrt{3}i}{6} & 0 & 0 & \frac{\sqrt{6}i}{6} & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & \frac{\sqrt{6}i}{6} & 0 \end{bmatrix}$
18	symmetry	x
	$\mathbb{T}_{1,1}^{(a)}(E)$	$\begin{bmatrix} 0 & -\frac{\sqrt{3}i}{6} & -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{6}i}{12} & 0 \\ -\frac{\sqrt{3}i}{6} & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{2}i}{4} \end{bmatrix}$
19	symmetry	y
	$\mathbb{T}_{1,2}^{(a)}(E)$	$\begin{bmatrix} 0 & -\frac{\sqrt{3}}{6} & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{6}}{12} & 0 \\ \frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{2}}{4} \end{bmatrix}$
20	symmetry	z
	$\mathbb{T}_1^{(1,0;a)}(A_1)$	$\begin{bmatrix} -\frac{\sqrt{6}i}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 \end{bmatrix}$
21	symmetry	x
	$\mathbb{T}_{1,1}^{(1,0;a)}(E)$	$\begin{bmatrix} 0 & -\frac{\sqrt{6}i}{6} & \frac{i}{4} & 0 & -\frac{\sqrt{3}i}{12} & 0 \\ -\frac{\sqrt{6}i}{6} & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & -\frac{i}{4} \end{bmatrix}$
22	symmetry	y
	$\mathbb{T}_{1,2}^{(1,0;a)}(E)$	$\begin{bmatrix} 0 & -\frac{\sqrt{6}}{6} & -\frac{1}{4} & 0 & -\frac{\sqrt{3}}{12} & 0 \\ \frac{\sqrt{6}}{6} & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & -\frac{1}{4} \end{bmatrix}$
23	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{M}_2^{(1,-1;a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{1}{2} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{1}{2} & 0 \end{bmatrix}$
24	symmetry	$\sqrt{3}yz$
	$\mathbb{M}_{2,1}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & -\frac{i}{4} & 0 & -\frac{\sqrt{3}i}{4} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{4} & 0 & \frac{i}{4} \end{bmatrix}$
25	symmetry	$-\sqrt{3}xz$

continued ...

Table 2

No.	multipole	matrix
	$\mathbb{M}_{2,2}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & \frac{1}{4} & 0 & -\frac{\sqrt{3}}{4} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{4} & 0 & \frac{1}{4} \end{bmatrix}$
26	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{M}_{2,1}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 \end{bmatrix}$
27	symmetry	$-\sqrt{3}xy$
	$\mathbb{M}_{2,2}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{i}{2} \\ 0 & 0 & \frac{i}{2} & 0 & 0 & 0 \end{bmatrix}$
28	symmetry	1
	$\mathbb{M}_{0}^{(1,1;a)}(A_2)$	$\begin{bmatrix} -\frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{1}{2} & 0 & 0 & 0 & 0 \end{bmatrix}$

bra: $= \langle \frac{1}{2}, \frac{1}{2}; s|, \langle \frac{1}{2}, -\frac{1}{2}; s|$

ket: $= |\frac{3}{2}, \frac{3}{2}; d\rangle, |\frac{3}{2}, \frac{1}{2}; d\rangle, |\frac{3}{2}, -\frac{1}{2}; d\rangle, |\frac{3}{2}, -\frac{3}{2}; d\rangle, |\frac{5}{2}, \frac{5}{2}; d\rangle, |\frac{5}{2}, \frac{3}{2}; d\rangle, |\frac{5}{2}, \frac{1}{2}; d\rangle, |\frac{5}{2}, -\frac{1}{2}; d\rangle, |\frac{5}{2}, -\frac{3}{2}; d\rangle, |\frac{5}{2}, -\frac{5}{2}; d\rangle$

Table 3: (s,d) block.

No.	multipole	matrix
29	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{Q}_{2}^{(a)}(A_1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{10} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{10} & 0 & 0 \end{bmatrix}$
30	symmetry	$\sqrt{3}xz$
	$\mathbb{Q}_{2,1}^{(a)}(E,1)$	$\begin{bmatrix} \frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & -\frac{\sqrt{10}}{10} & 0 & \frac{\sqrt{5}}{10} & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{10}}{10} & 0 \end{bmatrix}$
31	symmetry	$\sqrt{3}yz$
	$\mathbb{Q}_{2,2}^{(a)}(E,1)$	$\begin{bmatrix} \frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{10}i}{10} & 0 \end{bmatrix}$
32	symmetry	$\sqrt{3}xy$

continued ...

Table 3

No.	multipole	matrix
	$\mathbb{Q}_{2,1}^{(a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{10}i}{10} & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 \\ \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} \end{bmatrix}$
33	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{Q}_{2,2}^{(a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{10}}{10} & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 \\ \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \end{bmatrix}$
34	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{Q}_{2}^{(1,0;a)}(A_1)$	$\begin{bmatrix} 0 & \frac{\sqrt{15}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 \end{bmatrix}$
35	symmetry	$\sqrt{3}xz$
	$\mathbb{Q}_{2,1}^{(1,0;a)}(E,1)$	$\begin{bmatrix} -\frac{\sqrt{15}}{20} & 0 & \frac{3\sqrt{5}}{20} & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & \frac{\sqrt{30}}{30} & 0 & 0 \\ 0 & \frac{3\sqrt{5}}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{30}}{30} & 0 & \frac{\sqrt{15}}{15} & 0 \end{bmatrix}$
36	symmetry	$\sqrt{3}yz$
	$\mathbb{Q}_{2,2}^{(1,0;a)}(E,1)$	$\begin{bmatrix} -\frac{\sqrt{15}i}{20} & 0 & -\frac{3\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & -\frac{\sqrt{30}i}{30} & 0 & 0 \\ 0 & \frac{3\sqrt{5}i}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{\sqrt{30}i}{30} & 0 & -\frac{\sqrt{15}i}{15} & 0 \end{bmatrix}$
37	symmetry	$\sqrt{3}xy$
	$\mathbb{Q}_{2,1}^{(1,0;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{15}i}{10} & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{30} & 0 \\ -\frac{\sqrt{15}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{30} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} \end{bmatrix}$
38	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{Q}_{2,2}^{(1,0;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{15}}{10} & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & \frac{\sqrt{15}}{30} & 0 \\ -\frac{\sqrt{15}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{30} & 0 & 0 & 0 & \frac{\sqrt{3}}{6} \end{bmatrix}$
39	symmetry	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$
	$\mathbb{G}_{3}^{(1,-1;a)}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} \\ 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
40	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{G}_{3}^{(1,-1;a)}(A_2,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} & 0 & 0 \end{bmatrix}$
41	symmetry	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$

continued ...

Table 3

No.	multipole	matrix
	$\mathbb{G}_3^{(1,-1;a)}(A_2,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
42	symmetry	$\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{G}_{3,1}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & \frac{\sqrt{3}}{6} & 0 \end{bmatrix}$
43	symmetry	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{G}_{3,2}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{6}i}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{6} & 0 & -\frac{\sqrt{3}i}{6} & 0 \end{bmatrix}$
44	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{G}_{3,1}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{12} & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} \end{bmatrix}$
45	symmetry	$\sqrt{15}xyz$
	$\mathbb{G}_{3,2}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & \frac{\sqrt{30}}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{12} & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} \end{bmatrix}$
46	symmetry	z
	$\mathbb{G}_1^{(1,1;a)}(A_2)$	$\begin{bmatrix} 0 & -\frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
47	symmetry	$-y$
	$\mathbb{G}_{1,1}^{(1,1;a)}(E)$	$\begin{bmatrix} \frac{\sqrt{3}}{4} & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{4} & 0 & \frac{\sqrt{3}}{4} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
48	symmetry	x
	$\mathbb{G}_{1,2}^{(1,1;a)}(E)$	$\begin{bmatrix} \frac{\sqrt{3}i}{4} & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{4} & 0 & -\frac{\sqrt{3}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
49	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{T}_2^{(a)}(A_1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{10} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{10} & 0 & 0 \end{bmatrix}$
50	symmetry	$\sqrt{3}xz$

continued ...

Table 3

No.	multipole	matrix
	$\mathbb{T}^{(a)}_{2,1}(E,1)$	$\begin{bmatrix} \frac{\sqrt{10}i}{20} & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{20} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & \frac{\sqrt{10}i}{10} & 0 \end{bmatrix}$
51	symmetry	$\sqrt{3}yz$
	$\mathbb{T}^{(a)}_{2,2}(E,1)$	$\begin{bmatrix} -\frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & \frac{\sqrt{5}}{10} & 0 & 0 \\ 0 & \frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{10}}{10} & 0 \end{bmatrix}$
52	symmetry	$\sqrt{3}xy$
	$\mathbb{T}^{(a)}_{2,1}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{10}}{10} & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 \\ -\frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \end{bmatrix}$
53	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{T}^{(a)}_{2,2}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 \\ \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \end{bmatrix}$
54	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{T}^{(1,0;a)}_{2}(A_1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{15}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 \end{bmatrix}$
55	symmetry	$\sqrt{3}xz$
	$\mathbb{T}^{(1,0;a)}_{2,1}(E,1)$	$\begin{bmatrix} \frac{\sqrt{15}i}{20} & 0 & -\frac{3\sqrt{5}i}{20} & 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & -\frac{\sqrt{30}i}{30} & 0 & 0 \\ 0 & -\frac{3\sqrt{5}i}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & \frac{\sqrt{30}i}{30} & 0 & -\frac{\sqrt{15}i}{15} & 0 \end{bmatrix}$
56	symmetry	$\sqrt{3}yz$
	$\mathbb{T}^{(1,0;a)}_{2,2}(E,1)$	$\begin{bmatrix} -\frac{\sqrt{15}}{20} & 0 & -\frac{3\sqrt{5}}{20} & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 \\ 0 & \frac{3\sqrt{5}}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{30}}{30} & 0 & -\frac{\sqrt{15}}{15} & 0 \end{bmatrix}$
57	symmetry	$\sqrt{3}xy$
	$\mathbb{T}^{(1,0;a)}_{2,1}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{15}}{10} & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 \\ -\frac{\sqrt{15}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{30} & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \end{bmatrix}$
58	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{T}^{(1,0;a)}_{2,2}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{15}i}{10} & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{30} & 0 \\ \frac{\sqrt{15}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} \end{bmatrix}$
59	symmetry	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$

continued ...

Table 3

No.	multipole	matrix
	$\mathbb{M}_3^{(1,-1;a)}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
60	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{M}_3^{(1,-1;a)}(A_2,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{2} & 0 & 0 \end{bmatrix}$
61	symmetry	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$
	$\mathbb{M}_3^{(1,-1;a)}(A_2,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} \\ 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
62	symmetry	$\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{M}_{3,1}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{6}i}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 & -\frac{\sqrt{3}i}{6} & 0 \end{bmatrix}$
63	symmetry	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{M}_{3,2}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & -\frac{\sqrt{3}}{6} & 0 \end{bmatrix}$
64	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & -\frac{\sqrt{30}}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{12} & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \end{bmatrix}$
65	symmetry	$\sqrt{15}xyz$
	$\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{12} & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} \end{bmatrix}$
66	symmetry	z
	$\mathbb{M}_1^{(1,1;a)}(A_2)$	$\begin{bmatrix} 0 & -\frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
67	symmetry	$-y$
	$\mathbb{M}_{1,1}^{(1,1;a)}(E)$	$\begin{bmatrix} -\frac{\sqrt{3}i}{4} & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{4} & 0 & -\frac{\sqrt{3}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
68	symmetry	x

continued ...

Table 3

No.	multipole	matrix
	$\mathbb{M}_{1,2}^{(1,1;a)}(E)$	$\begin{bmatrix} \frac{\sqrt{3}}{4} & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{4} & 0 & -\frac{\sqrt{3}}{4} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$

bra: $= \langle \frac{1}{2}, \frac{1}{2}; s| \, , \langle \frac{1}{2}, -\frac{1}{2}; s|$

ket: $= |\frac{5}{2}, \frac{5}{2}; f\rangle \, , |\frac{5}{2}, \frac{3}{2}; f\rangle \, , |\frac{5}{2}, \frac{1}{2}; f\rangle \, , |\frac{5}{2}, -\frac{1}{2}; f\rangle \, , |\frac{5}{2}, -\frac{3}{2}; f\rangle \, , |\frac{5}{2}, -\frac{5}{2}; f\rangle \, , |\frac{7}{2}, \frac{7}{2}; f\rangle \, , |\frac{7}{2}, \frac{5}{2}; f\rangle \, , |\frac{7}{2}, \frac{3}{2}; f\rangle \, , |\frac{7}{2}, \frac{1}{2}; f\rangle \, , |\frac{7}{2}, -\frac{1}{2}; f\rangle \, , |\frac{7}{2}, -\frac{3}{2}; f\rangle \, , |\frac{7}{2}, -\frac{5}{2}; f\rangle \, , |\frac{7}{2}, -\frac{7}{2}; f\rangle$

Table 4: (s,f) block.

No.	multipole	matrix
69	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{Q}_3^{(a)}(A_1, 1)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 \end{bmatrix}$
70	symmetry	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$
	$\mathbb{Q}_3^{(a)}(A_1, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 \\ -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} \end{bmatrix}$
71	symmetry	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$
	$\mathbb{Q}_3^{(a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 \\ -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \end{bmatrix}$
72	symmetry	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{Q}_{3,1}^{(a)}(E, 1)$	$\begin{bmatrix} 0 & \frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 & \frac{\sqrt{70}}{28} & 0 & 0 \end{bmatrix}$
73	symmetry	$-\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{Q}_{3,2}^{(a)}(E, 1)$	$\begin{bmatrix} 0 & \frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{14}i}{14} & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 \end{bmatrix}$
74	symmetry	$\sqrt{15}xyz$
	$\mathbb{Q}_{3,1}^{(a)}(E, 2)$	$\begin{bmatrix} -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 \\ 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & -\frac{\sqrt{21}i}{14} & 0 \end{bmatrix}$
75	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 4

No.	multipole	matrix
	$\mathbb{Q}_{3,2}^{(a)}(E,2)$	$\begin{bmatrix} -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 \\ 0 & \frac{\sqrt{70}}{28} & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 \end{bmatrix}$
76	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{Q}_{3}^{(1,0;a)}(A_1,1)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 \end{bmatrix}$
77	symmetry	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$
	$\mathbb{Q}_{3}^{(1,0;a)}(A_1,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{7} & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 \\ \frac{\sqrt{7}i}{7} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{8} \end{bmatrix}$
78	symmetry	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$
	$\mathbb{Q}_{3}^{(1,0;a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 \\ \frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{8} \end{bmatrix}$
79	symmetry	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{Q}_{3,1}^{(1,0;a)}(E,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{21}}{21} & 0 & \frac{\sqrt{42}}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{56} & 0 & \frac{3\sqrt{14}}{56} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}}{21} & 0 & -\frac{\sqrt{21}}{21} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{56} & 0 & \frac{\sqrt{210}}{56} & 0 & 0 \end{bmatrix}$
80	symmetry	$-\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{Q}_{3,2}^{(1,0;a)}(E,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{21}i}{21} & 0 & -\frac{\sqrt{42}i}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{56} & 0 & -\frac{3\sqrt{14}i}{56} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}i}{21} & 0 & \frac{\sqrt{21}i}{21} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{56} & 0 & -\frac{\sqrt{210}i}{56} & 0 & 0 \end{bmatrix}$
81	symmetry	$\sqrt{15}xyz$
	$\mathbb{Q}_{3,1}^{(1,0;a)}(E,2)$	$\begin{bmatrix} \frac{\sqrt{42}i}{42} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{42} & 0 & 0 & \frac{3\sqrt{7}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 \\ 0 & -\frac{\sqrt{210}i}{42} & 0 & 0 & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & -\frac{3\sqrt{7}i}{28} & 0 \end{bmatrix}$
82	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{Q}_{3,2}^{(1,0;a)}(E,2)$	$\begin{bmatrix} \frac{\sqrt{42}}{42} & 0 & 0 & 0 & \frac{\sqrt{210}}{42} & 0 & 0 & \frac{3\sqrt{7}}{28} & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 \\ 0 & -\frac{\sqrt{210}}{42} & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & \frac{3\sqrt{7}}{28} & 0 \end{bmatrix}$
83	symmetry	$\frac{\sqrt{70}xz\left(x^2-3y^2\right)}{4}$
	$\mathbb{G}_{4}^{(1,-1;a)}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} \end{bmatrix}$
84	symmetry	$\frac{3x^4}{8}+\frac{3x^2y^2}{4}-3x^2z^2+\frac{3y^4}{8}-3y^2z^2+z^4$

continued ...

Table 4

No.	multipole	matrix
	$\mathbb{G}_4^{(1,-1;a)}(A_2,1)$	$\begin{bmatrix} 0&0&0&0&0&0&0&0&0&\frac{i}{2}&0&0&0&0 \\ 0&0&0&0&0&0&0&0&0&0&-\frac{i}{2}&0&0&0 \end{bmatrix}$
85	symmetry	$\frac{\sqrt{70}yz\left(3x^2-y^2\right)}{4}$
	$\mathbb{G}_4^{(1,-1;a)}(A_2,2)$	$\begin{bmatrix} 0&0&0&0&0&0&\frac{\sqrt{2}}{8}&0&0&0&0&0&\frac{\sqrt{14}}{8}&0 \\ 0&0&0&0&0&0&0&-\frac{\sqrt{14}}{8}&0&0&0&0&0&-\frac{\sqrt{2}}{8} \end{bmatrix}$
86	symmetry	$-\frac{\sqrt{10}yz\left(3x^2+3y^2-4z^2\right)}{4}$
	$\mathbb{G}_{4,1}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0&0&0&0&0&0&0&0&\frac{\sqrt{6}}{8}&0&\frac{\sqrt{10}}{8}&0&0&0 \\ 0&0&0&0&0&0&0&0&0&-\frac{\sqrt{10}}{8}&0&-\frac{\sqrt{6}}{8}&0&0 \end{bmatrix}$
87	symmetry	$\frac{\sqrt{10}xz\left(3x^2+3y^2-4z^2\right)}{4}$
	$\mathbb{G}_{4,2}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0&0&0&0&0&0&0&0&\frac{\sqrt{6}i}{8}&0&-\frac{\sqrt{10}i}{8}&0&0&0 \\ 0&0&0&0&0&0&0&0&0&-\frac{\sqrt{10}i}{8}&0&\frac{\sqrt{6}i}{8}&0&0 \end{bmatrix}$
88	symmetry	$\frac{\sqrt{35}\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$
	$\mathbb{G}_{4,1}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0&0&0&0&0&0&0&0&0&0&0&0&0&\frac{i}{2} \\ 0&0&0&0&0&0&-\frac{i}{2}&0&0&0&0&0&0&0 \end{bmatrix}$
89	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
	$\mathbb{G}_{4,2}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0&0&0&0&0&0&0&0&0&0&0&0&0&\frac{1}{2} \\ 0&0&0&0&0&0&\frac{1}{2}&0&0&0&0&0&0&0 \end{bmatrix}$
90	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$
	$\mathbb{G}_{4,1}^{(1,-1;a)}(E,3)$	$\begin{bmatrix} 0&0&0&0&0&0&0&\frac{i}{4}&0&0&0&\frac{\sqrt{3}i}{4}&0&0 \\ 0&0&0&0&0&0&0&0&-\frac{\sqrt{3}i}{4}&0&0&0&-\frac{i}{4}&0 \end{bmatrix}$
91	symmetry	$\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$
	$\mathbb{G}_{4,2}^{(1,-1;a)}(E,3)$	$\begin{bmatrix} 0&0&0&0&0&0&0&\frac{1}{4}&0&0&0&-\frac{\sqrt{3}}{4}&0&0 \\ 0&0&0&0&0&0&0&0&-\frac{\sqrt{3}}{4}&0&0&0&\frac{1}{4}&0 \end{bmatrix}$
92	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{G}_2^{(1,1;a)}(A_2)$	$\begin{bmatrix} 0&0&-\frac{i}{2}&0&0&0&0&0&0&0&0&0&0&0 \\ 0&0&0&-\frac{i}{2}&0&0&0&0&0&0&0&0&0&0 \end{bmatrix}$
93	symmetry	$\sqrt{3}yz$

continued ...

Table 4

No.	multipole	matrix
	$\mathbb{G}_{2,1}^{(1,1;a)}(E,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{6}}{6} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
94	symmetry	$-\sqrt{3}xz$
	$\mathbb{G}_{2,2}^{(1,1;a)}(E,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{6}i}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
95	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{G}_{2,1}^{(1,1;a)}(E,2)$	$\begin{bmatrix} -\frac{\sqrt{30}i}{12} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
96	symmetry	$-\sqrt{3}xy$
	$\mathbb{G}_{2,2}^{(1,1;a)}(E,2)$	$\begin{bmatrix} -\frac{\sqrt{30}}{12} & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & \frac{\sqrt{30}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
97	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{T}_{3}^{(a)}(A_1,1)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{7} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{7} & 0 & 0 & 0 \end{bmatrix}$
98	symmetry	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$
	$\mathbb{T}_{3}^{(a)}(A_1,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 \\ \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \end{bmatrix}$
99	symmetry	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$
	$\mathbb{T}_{3}^{(a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{14} & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 \\ -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \end{bmatrix}$
100	symmetry	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{T}_{3,1}^{(a)}(E,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{7}i}{14} & 0 & -\frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{14}i}{14} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 \end{bmatrix}$
101	symmetry	$-\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{T}_{3,2}^{(a)}(E,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{28} & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{14}}{14} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & \frac{\sqrt{70}}{28} & 0 & 0 \end{bmatrix}$
102	symmetry	$\sqrt{15}xyz$

continued ...

Table 4

No.	multipole	matrix
	$\mathbb{T}^{(a)}_{3,1}(E,2)$	$\begin{bmatrix} \frac{\sqrt{14}}{28} & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 \\ 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 \end{bmatrix}$
103	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{T}^{(a)}_{3,2}(E,2)$	$\begin{bmatrix} -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 \\ 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 \end{bmatrix}$
104	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{T}^{(1,0;a)}_{3}(A_1,1)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{7}i}{7} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}i}{7} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 \end{bmatrix}$
105	symmetry	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$
	$\mathbb{T}^{(1,0;a)}_{3}(A_1,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{7} & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 \\ \frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{8} \end{bmatrix}$
106	symmetry	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$
	$\mathbb{T}^{(1,0;a)}_{3}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{7} & \frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 \\ -\frac{\sqrt{7}i}{7} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{8} \end{bmatrix}$
107	symmetry	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{T}^{(1,0;a)}_{3,1}(E,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{21}i}{21} & 0 & -\frac{\sqrt{42}i}{21} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{56} & 0 & -\frac{3\sqrt{14}i}{56} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}i}{21} & 0 & \frac{\sqrt{21}i}{21} & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}i}{56} & 0 & -\frac{\sqrt{210}i}{56} & 0 & 0 \end{bmatrix}$
108	symmetry	$-\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{T}^{(1,0;a)}_{3,2}(E,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{21}}{21} & 0 & -\frac{\sqrt{42}}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{56} & 0 & -\frac{3\sqrt{14}}{56} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}}{21} & 0 & \frac{\sqrt{21}}{21} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{56} & 0 & -\frac{\sqrt{210}}{56} & 0 & 0 \end{bmatrix}$
109	symmetry	$\sqrt{15}xyz$
	$\mathbb{T}^{(1,0;a)}_{3,1}(E,2)$	$\begin{bmatrix} \frac{\sqrt{42}}{42} & 0 & 0 & 0 & -\frac{\sqrt{210}}{42} & 0 & 0 & \frac{3\sqrt{7}}{28} & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 \\ 0 & -\frac{\sqrt{210}}{42} & 0 & 0 & 0 & \frac{\sqrt{42}}{42} & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & -\frac{3\sqrt{7}}{28} & 0 \end{bmatrix}$
110	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{T}^{(1,0;a)}_{3,2}(E,2)$	$\begin{bmatrix} -\frac{\sqrt{42}i}{42} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{42} & 0 & 0 & -\frac{3\sqrt{7}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 \\ 0 & \frac{\sqrt{210}i}{42} & 0 & 0 & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & -\frac{3\sqrt{7}i}{28} & 0 \end{bmatrix}$
111	symmetry	$\frac{\sqrt{70}xz\left(x^2-3y^2\right)}{4}$

continued ...

Table 4

No.	multipole	matrix
	$\mathbb{M}_4^{(1,-1;a)}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} \end{bmatrix}$
112	symmetry	$\frac{3x^4}{8}+\frac{3x^2y^2}{4}-3x^2z^2+\frac{3y^4}{8}-3y^2z^2+z^4$
	$\mathbb{M}_4^{(1,-1;a)}(A_2,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 \end{bmatrix}$
113	symmetry	$\frac{\sqrt{70}yz\left(3x^2-y^2\right)}{4}$
	$\mathbb{M}_4^{(1,-1;a)}(A_2,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} \end{bmatrix}$
114	symmetry	$-\frac{\sqrt{10}yz\left(3x^2+3y^2-4z^2\right)}{4}$
	$\mathbb{M}_{4,1}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{8} & 0 & -\frac{\sqrt{10}i}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{8} & 0 & \frac{\sqrt{6}i}{8} & 0 & 0 \end{bmatrix}$
115	symmetry	$\frac{\sqrt{10}xz\left(3x^2+3y^2-4z^2\right)}{4}$
	$\mathbb{M}_{4,2}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{8} & 0 & -\frac{\sqrt{10}}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{8} & 0 & \frac{\sqrt{6}}{8} & 0 & 0 \end{bmatrix}$
116	symmetry	$\frac{\sqrt{35}\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$
	$\mathbb{M}_{4,1}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
117	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
	$\mathbb{M}_{4,2}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
118	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$
	$\mathbb{M}_{4,1}^{(1,-1;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & \frac{\sqrt{3}}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{4} & 0 & 0 & 0 & -\frac{1}{4} & 0 \end{bmatrix}$
119	symmetry	$\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$
	$\mathbb{M}_{4,2}^{(1,-1;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & \frac{\sqrt{3}i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{4} & 0 & 0 & 0 & -\frac{i}{4} & 0 \end{bmatrix}$
120	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$

continued ...

Table 4

No.	multipole	matrix
	$\mathbb{M}_2^{(1,1;a)}(A_2)$	$\begin{bmatrix} 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
121	symmetry	$\sqrt{3}yz$
	$\mathbb{M}_{2,1}^{(1,1;a)}(E,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{6}i}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
122	symmetry	$-\sqrt{3}xz$
	$\mathbb{M}_{2,2}^{(1,1;a)}(E,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{6}}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
123	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{M}_{2,1}^{(1,1;a)}(E,2)$	$\begin{bmatrix} -\frac{\sqrt{30}}{12} & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & -\frac{\sqrt{30}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
124	symmetry	$-\sqrt{3}xy$
	$\mathbb{M}_{2,2}^{(1,1;a)}(E,2)$	$\begin{bmatrix} \frac{\sqrt{30}i}{12} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$

bra: $= \langle \frac{1}{2}, \frac{1}{2}; p|\,, \langle \frac{1}{2}, -\frac{1}{2}; p|\,, \langle \frac{3}{2}, \frac{3}{2}; p|\,, \langle \frac{3}{2}, \frac{1}{2}; p|\,, \langle \frac{3}{2}, -\frac{1}{2}; p|\,, \langle \frac{3}{2}, -\frac{3}{2}; p|$
ket: $= |\frac{1}{2}, \frac{1}{2}; p\rangle\,, |\frac{1}{2}, -\frac{1}{2}; p\rangle\,, |\frac{3}{2}, \frac{3}{2}; p\rangle\,, |\frac{3}{2}, \frac{1}{2}; p\rangle\,, |\frac{3}{2}, -\frac{1}{2}; p\rangle\,, |\frac{3}{2}, -\frac{3}{2}; p\rangle$

Table 5: (p,p) block.

No.	multipole	matrix
125	symmetry	1
	$\mathbb{Q}_0^{(a)}(A_1)$	$\begin{bmatrix} \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} \end{bmatrix}$

continued ...

Table 5

No.	multipole	matrix
126	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{Q}_2^{(a)}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ -\frac{\sqrt{6}}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 \\ 0 & \frac{\sqrt{6}}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \end{bmatrix}$
127	symmetry	$\sqrt{3}xz$
	$\mathbb{Q}_{2,1}^{(a)}(E,1)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{2}}{4} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{6}}{12} \\ \frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{4} & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & \frac{\sqrt{6}}{12} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \end{bmatrix}$
128	symmetry	$\sqrt{3}yz$
	$\mathbb{Q}_{2,2}^{(a)}(E,1)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{6}i}{12} \\ -\frac{\sqrt{6}i}{12} & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 \end{bmatrix}$
129	symmetry	$\sqrt{3}xy$
	$\mathbb{Q}_{2,1}^{(a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{6} \\ 0 & 0 & \frac{\sqrt{6}i}{6} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} \\ 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 \\ -\frac{\sqrt{6}i}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 \end{bmatrix}$
130	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 5

No.	multipole	matrix
	$\mathbb{Q}_{2,2}^{(a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{6} \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{6} & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ -\frac{\sqrt{6}}{6} & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 \end{bmatrix}$
131	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{Q}_{2}^{(1,-1;a)}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ -\frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & \frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{6}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} \end{bmatrix}$
132	symmetry	$\sqrt{3}xz$
	$\mathbb{Q}_{2,1}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{3}}{12} & 0 & -\frac{1}{4} & 0 \\ 0 & 0 & 0 & -\frac{1}{4} & 0 & \frac{\sqrt{3}}{12} \\ \frac{\sqrt{3}}{12} & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & -\frac{1}{4} & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ -\frac{1}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{6} \\ 0 & \frac{\sqrt{3}}{12} & 0 & 0 & -\frac{\sqrt{6}}{6} & 0 \end{bmatrix}$
133	symmetry	$\sqrt{3}yz$
	$\mathbb{Q}_{2,2}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & \frac{i}{4} & 0 \\ 0 & 0 & 0 & -\frac{i}{4} & 0 & -\frac{\sqrt{3}i}{12} \\ -\frac{\sqrt{3}i}{12} & 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 \\ 0 & \frac{i}{4} & \frac{\sqrt{6}i}{6} & 0 & 0 & 0 \\ -\frac{i}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{6} \\ 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 \end{bmatrix}$
134	symmetry	$\sqrt{3}xy$

continued ...

Table 5

No.	multipole	matrix
	$\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} \\ 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{6} \\ 0 & 0 & \frac{\sqrt{6}i}{6} & 0 & 0 & 0 \\ -\frac{\sqrt{3}i}{6} & 0 & 0 & \frac{\sqrt{6}i}{6} & 0 & 0 \end{bmatrix}$
135	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 \end{bmatrix}$
136	symmetry	1
	$\mathbb{Q}_{0}^{(1,1;a)}(A_1)$	$\begin{bmatrix} -\frac{\sqrt{3}}{3} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{3} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} \end{bmatrix}$
137	symmetry	z
	$\mathbb{G}_{1}^{(1,0;a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{i}{2} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{i}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
138	symmetry	$-y$

continued ...

Table 5

No.	multipole	matrix
	$\mathbb{G}_{1,1}^{(1,0;a)}(E)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{3}}{4} & 0 & \frac{1}{4} & 0 \\ 0 & 0 & 0 & \frac{1}{4} & 0 & \frac{\sqrt{3}}{4} \\ \frac{\sqrt{3}}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{4} & 0 & 0 & 0 & 0 \\ \frac{1}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{4} & 0 & 0 & 0 & 0 \end{bmatrix}$
139	symmetry	x
	$\mathbb{G}_{1,2}^{(1,0;a)}(E)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{3}i}{4} & 0 & -\frac{i}{4} & 0 \\ 0 & 0 & 0 & \frac{i}{4} & 0 & -\frac{\sqrt{3}i}{4} \\ -\frac{\sqrt{3}i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 \\ \frac{i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{4} & 0 & 0 & 0 & 0 \end{bmatrix}$
140	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{T}_{2}^{(1,0;a)}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{i}{2} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{i}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
141	symmetry	$\sqrt{3}xz$
	$\mathbb{T}_{2,1}^{(1,0;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & -\frac{i}{4} & 0 & \frac{\sqrt{3}i}{4} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{4} & 0 & -\frac{i}{4} \\ \frac{i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{4} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{3}i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{4} & 0 & 0 & 0 & 0 \end{bmatrix}$
142	symmetry	$\sqrt{3}yz$

continued ...

Table 5

No.	multipole	matrix
	$\mathbb{T}^{(1,0;a)}_{2,2}(E,1)$	$\begin{bmatrix} 0 & 0 & \frac{1}{4} & 0 & \frac{\sqrt{3}}{4} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{4} & 0 & -\frac{1}{4} \\ \frac{1}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{4} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{3}}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 \end{bmatrix}$
143	symmetry	$\sqrt{3}xy$
	$\mathbb{T}^{(1,0;a)}_{2,1}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & \frac{1}{2} & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
144	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{T}^{(1,0;a)}_{2,2}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{i}{2} \\ 0 & 0 & -\frac{i}{2} & 0 & 0 & 0 \\ 0 & \frac{i}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{i}{2} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
145	symmetry	z
	$\mathbb{M}^{(a)}_{1}(A_2)$	$\begin{bmatrix} \frac{1}{3} & 0 & 0 & \frac{\sqrt{2}}{6} & 0 & 0 \\ 0 & -\frac{1}{3} & 0 & 0 & \frac{\sqrt{2}}{6} & 0 \\ 0 & 0 & \frac{1}{2} & 0 & 0 & 0 \\ \frac{\sqrt{2}}{6} & 0 & 0 & \frac{1}{6} & 0 & 0 \\ 0 & \frac{\sqrt{2}}{6} & 0 & 0 & -\frac{1}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{1}{2} \end{bmatrix}$
146	symmetry	$-y$

continued ...

Table 5

No.	multipole	matrix
	$\mathbb{M}^{(a)}_{1,1}(E)$	$\begin{bmatrix} 0 & \frac{i}{3} & \frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{2}i}{12} & 0 \\ -\frac{i}{3} & 0 & 0 & \frac{\sqrt{2}i}{12} & 0 & \frac{\sqrt{6}i}{12} \\ -\frac{\sqrt{6}i}{12} & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{12} & -\frac{\sqrt{3}i}{6} & 0 & \frac{i}{3} & 0 \\ -\frac{\sqrt{2}i}{12} & 0 & 0 & -\frac{i}{3} & 0 & \frac{\sqrt{3}i}{6} \\ 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 \end{bmatrix}$
147	symmetry	x
	$\mathbb{M}^{(a)}_{1,2}(E)$	$\begin{bmatrix} 0 & \frac{1}{3} & -\frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{2}}{12} & 0 \\ \frac{1}{3} & 0 & 0 & -\frac{\sqrt{2}}{12} & 0 & \frac{\sqrt{6}}{12} \\ -\frac{\sqrt{6}}{12} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{12} & \frac{\sqrt{3}}{6} & 0 & \frac{1}{3} & 0 \\ \frac{\sqrt{2}}{12} & 0 & 0 & \frac{1}{3} & 0 & \frac{\sqrt{3}}{6} \\ 0 & \frac{\sqrt{6}}{12} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \end{bmatrix}$
148	symmetry	z
	$\mathbb{M}^{(1,-1;a)}_{1}(A_2)$	$\begin{bmatrix} -\frac{\sqrt{6}}{18} & 0 & 0 & -\frac{2\sqrt{3}}{9} & 0 & 0 \\ 0 & \frac{\sqrt{6}}{18} & 0 & 0 & -\frac{2\sqrt{3}}{9} & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ -\frac{2\sqrt{3}}{9} & 0 & 0 & \frac{\sqrt{6}}{18} & 0 & 0 \\ 0 & -\frac{2\sqrt{3}}{9} & 0 & 0 & -\frac{\sqrt{6}}{18} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{6} \end{bmatrix}$
149	symmetry	$-y$
	$\mathbb{M}^{(1,-1;a)}_{1,1}(E)$	$\begin{bmatrix} 0 & -\frac{\sqrt{6}i}{18} & -\frac{i}{3} & 0 & -\frac{\sqrt{3}i}{9} & 0 \\ \frac{\sqrt{6}i}{18} & 0 & 0 & -\frac{\sqrt{3}i}{9} & 0 & -\frac{i}{3} \\ \frac{i}{3} & 0 & 0 & \frac{\sqrt{2}i}{6} & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{9} & -\frac{\sqrt{2}i}{6} & 0 & \frac{\sqrt{6}i}{9} & 0 \\ \frac{\sqrt{3}i}{9} & 0 & 0 & -\frac{\sqrt{6}i}{9} & 0 & \frac{\sqrt{2}i}{6} \\ 0 & \frac{i}{3} & 0 & 0 & -\frac{\sqrt{2}i}{6} & 0 \end{bmatrix}$
150	symmetry	x

continued ...

Table 5

No.	multipole	matrix
	$\mathbb{M}_{1,2}^{(1,-1;a)}(E)$	$\begin{bmatrix} 0 & -\frac{\sqrt{6}}{18} & \frac{1}{3} & 0 & -\frac{\sqrt{3}}{9} & 0 \\ -\frac{\sqrt{6}}{18} & 0 & 0 & \frac{\sqrt{3}}{9} & 0 & -\frac{1}{3} \\ \frac{1}{3} & 0 & 0 & \frac{\sqrt{2}}{6} & 0 & 0 \\ 0 & \frac{\sqrt{3}}{9} & \frac{\sqrt{2}}{6} & 0 & \frac{\sqrt{6}}{9} & 0 \\ -\frac{\sqrt{3}}{9} & 0 & 0 & \frac{\sqrt{6}}{9} & 0 & \frac{\sqrt{2}}{6} \\ 0 & -\frac{1}{3} & 0 & 0 & \frac{\sqrt{2}}{6} & 0 \end{bmatrix}$
151	symmetry	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$
	$\mathbb{M}_{3}^{(1,-1;a)}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{2} & 0 & 0 & 0 \end{bmatrix}$
152	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{M}_{3}^{(1,-1;a)}(A_2,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{5}}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} \end{bmatrix}$
153	symmetry	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$
	$\mathbb{M}_{3}^{(1,-1;a)}(A_2,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{2} & 0 & 0 & 0 \end{bmatrix}$
154	symmetry	$\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$

continued ...

Table 5

No.	multipole	matrix
	$\mathbb{M}_{3,1}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}i}{10} & 0 & \frac{\sqrt{30}i}{10} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}i}{10} & 0 & -\frac{\sqrt{10}i}{10} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{10} & 0 \end{bmatrix}$
155	symmetry	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{M}_{3,2}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}}{10} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}}{10} & 0 & \frac{\sqrt{30}}{10} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}}{10} & 0 & -\frac{\sqrt{10}}{10} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{10} & 0 \end{bmatrix}$
156	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{1}{2} \\ 0 & 0 & \frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{2} & 0 & 0 \end{bmatrix}$
157	symmetry	$\sqrt{15}xyz$
	$\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} \\ 0 & 0 & -\frac{i}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{2} & 0 & 0 \end{bmatrix}$
158	symmetry	z

continued ...

Table 5

No.	multipole	matrix
	$\mathbb{M}_1^{(1,1;a)}(A_2)$	$\begin{bmatrix} \frac{\sqrt{30}}{9} & 0 & 0 & -\frac{\sqrt{15}}{18} & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{9} & 0 & 0 & -\frac{\sqrt{15}}{18} & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 & 0 \\ -\frac{\sqrt{15}}{18} & 0 & 0 & -\frac{\sqrt{30}}{90} & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{18} & 0 & 0 & \frac{\sqrt{30}}{90} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{30} \end{bmatrix}$
159	symmetry	$-y$
	$\mathbb{M}_{1,1}^{(1,1;a)}(E)$	$\begin{bmatrix} 0 & \frac{\sqrt{30}i}{9} & -\frac{\sqrt{5}i}{12} & 0 & -\frac{\sqrt{15}i}{36} & 0 \\ -\frac{\sqrt{30}i}{9} & 0 & 0 & -\frac{\sqrt{15}i}{36} & 0 & -\frac{\sqrt{5}i}{12} \\ \frac{\sqrt{5}i}{12} & 0 & 0 & -\frac{\sqrt{10}i}{30} & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{36} & \frac{\sqrt{10}i}{30} & 0 & -\frac{\sqrt{30}i}{45} & 0 \\ \frac{\sqrt{15}i}{36} & 0 & 0 & \frac{\sqrt{30}i}{45} & 0 & -\frac{\sqrt{10}i}{30} \\ 0 & \frac{\sqrt{5}i}{12} & 0 & 0 & \frac{\sqrt{10}i}{30} & 0 \end{bmatrix}$
160	symmetry	x
	$\mathbb{M}_{1,2}^{(1,1;a)}(E)$	$\begin{bmatrix} 0 & \frac{\sqrt{30}}{9} & \frac{\sqrt{5}}{12} & 0 & -\frac{\sqrt{15}}{36} & 0 \\ \frac{\sqrt{30}}{9} & 0 & 0 & \frac{\sqrt{15}}{36} & 0 & -\frac{\sqrt{5}}{12} \\ \frac{\sqrt{5}}{12} & 0 & 0 & -\frac{\sqrt{10}}{30} & 0 & 0 \\ 0 & \frac{\sqrt{15}}{36} & -\frac{\sqrt{10}}{30} & 0 & -\frac{\sqrt{30}}{45} & 0 \\ -\frac{\sqrt{15}}{36} & 0 & 0 & -\frac{\sqrt{30}}{45} & 0 & -\frac{\sqrt{10}}{30} \\ 0 & -\frac{\sqrt{5}}{12} & 0 & 0 & -\frac{\sqrt{10}}{30} & 0 \end{bmatrix}$

bra: $= \langle \frac{1}{2}, \frac{1}{2}; p|, \langle \frac{1}{2}, -\frac{1}{2}; p|, \langle \frac{3}{2}, \frac{3}{2}; p|, \langle \frac{3}{2}, \frac{1}{2}; p|, \langle \frac{3}{2}, -\frac{1}{2}; p|, \langle \frac{3}{2}, -\frac{3}{2}; p|$
ket: $= |\frac{3}{2}, \frac{3}{2}; d\rangle, |\frac{3}{2}, \frac{1}{2}; d\rangle, |\frac{3}{2}, -\frac{1}{2}; d\rangle, |\frac{3}{2}, -\frac{3}{2}; d\rangle, |\frac{5}{2}, \frac{5}{2}; d\rangle, |\frac{5}{2}, \frac{3}{2}; d\rangle, |\frac{5}{2}, \frac{1}{2}; d\rangle, |\frac{5}{2}, -\frac{1}{2}; d\rangle, |\frac{5}{2}, -\frac{3}{2}; d\rangle, |\frac{5}{2}, -\frac{5}{2}; d\rangle$

Table 6: (p,d) block.

No.	multipole	matrix
161	symmetry	z

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{Q}_1^{(a)}(A_1)$	$\begin{bmatrix} 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{10} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{60} & 0 & 0 & 0 & 0 & \frac{3}{10} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{60} & 0 & 0 & 0 & 0 & \frac{3}{10} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{10} & 0 \end{bmatrix}$
162	symmetry	x
	$\mathbb{Q}_{1,1}^{(a)}(E)$	$\begin{bmatrix} -\frac{1}{4} & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{12} & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{20} & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{3}}{20} & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{20} & 0 & -\frac{\sqrt{6}}{30} & 0 & 0 & -\frac{3\sqrt{2}}{20} & 0 & \frac{3}{20} & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{30} & 0 & -\frac{\sqrt{2}}{20} & 0 & 0 & -\frac{3}{20} & 0 & \frac{3\sqrt{2}}{20} & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{20} & 0 & \frac{\sqrt{30}}{20} \end{bmatrix}$
163	symmetry	y
	$\mathbb{Q}_{1,2}^{(a)}(E)$	$\begin{bmatrix} -\frac{i}{4} & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{12} & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{20} & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{3}i}{20} & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{20} & 0 & \frac{\sqrt{6}i}{30} & 0 & 0 & -\frac{3\sqrt{2}i}{20} & 0 & -\frac{3i}{20} & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{30} & 0 & \frac{\sqrt{2}i}{20} & 0 & 0 & -\frac{3i}{20} & 0 & -\frac{3\sqrt{2}i}{20} & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{20} & 0 & -\frac{\sqrt{30}i}{20} \end{bmatrix}$
164	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{Q}_3^{(a)}(A_1,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 \\ \frac{1}{10} & 0 & 0 & 0 & 0 & -\frac{1}{5} & 0 & 0 & 0 & 0 \\ 0 & -\frac{3}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{15} & 0 & 0 & 0 \\ 0 & 0 & \frac{3}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{15} & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{10} & 0 & 0 & 0 & 0 & -\frac{1}{5} & 0 \end{bmatrix}$
165	symmetry	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{Q}_3^{(a)}(A_1,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 \end{bmatrix}$
166	symmetry	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$
	$\mathbb{Q}_3^{(a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 \end{bmatrix}$
167	symmetry	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{Q}_{3,1}^{(a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{1}{6} & 0 & -\frac{\sqrt{2}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{6} & 0 & \frac{1}{6} & 0 \\ 0 & \frac{\sqrt{2}}{10} & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & -\frac{\sqrt{3}}{10} & 0 & 0 & 0 \\ \frac{\sqrt{2}}{10} & 0 & -\frac{\sqrt{6}}{10} & 0 & 0 & -\frac{7\sqrt{2}}{60} & 0 & \frac{1}{30} & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{10} & 0 & \frac{\sqrt{2}}{10} & 0 & 0 & -\frac{1}{30} & 0 & \frac{7\sqrt{2}}{60} & 0 \\ 0 & 0 & \frac{\sqrt{2}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{10} & 0 & -\frac{\sqrt{30}}{60} \end{bmatrix}$
168	symmetry	$-\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{Q}_{3,2}^{(a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{i}{6} & 0 & \frac{\sqrt{2}i}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{6} & 0 & -\frac{i}{6} & 0 \\ 0 & -\frac{\sqrt{2}i}{10} & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & \frac{\sqrt{3}i}{10} & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{10} & 0 & \frac{\sqrt{6}i}{10} & 0 & 0 & -\frac{7\sqrt{2}i}{60} & 0 & -\frac{i}{30} & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{10} & 0 & -\frac{\sqrt{2}i}{10} & 0 & 0 & -\frac{i}{30} & 0 & -\frac{7\sqrt{2}i}{60} & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{10} & 0 & \frac{\sqrt{30}i}{60} \end{bmatrix}$
169	symmetry	$\sqrt{15}xyz$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{Q}_{3,1}^{(a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & 0 & \frac{\sqrt{10}i}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{12} & 0 & 0 & 0 & -\frac{\sqrt{2}i}{12} \\ 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{30} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & \frac{i}{6} & 0 & 0 & 0 & \frac{\sqrt{5}i}{30} & 0 \\ \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{30} & 0 & 0 & 0 & -\frac{i}{6} \\ 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{30} & 0 & 0 & 0 \end{bmatrix}$
170	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{Q}_{3,2}^{(a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & 0 & -\frac{\sqrt{10}}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{12} & 0 & 0 & 0 & \frac{\sqrt{2}}{12} \\ 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & \frac{1}{6} & 0 & 0 & 0 & -\frac{\sqrt{5}}{30} & 0 \\ \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{30} & 0 & 0 & 0 & \frac{1}{6} \\ 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 & 0 \end{bmatrix}$
171	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{Q}_{3}^{(1,-1;a)}(A_1,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{6} & 0 & 0 \\ \frac{\sqrt{6}}{60} & 0 & 0 & 0 & 0 & \frac{2\sqrt{6}}{15} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{20} & 0 & 0 & 0 & 0 & -\frac{4}{15} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{20} & 0 & 0 & 0 & 0 & -\frac{4}{15} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{60} & 0 & 0 & 0 & 0 & \frac{2\sqrt{6}}{15} & 0 \end{bmatrix}$
172	symmetry	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$
	$\mathbb{Q}_{3}^{(1,-1;a)}(A_1,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{6} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{3} \\ 0 & 0 & 0 & 0 & -\frac{i}{3} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{15}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 \end{bmatrix}$
173	symmetry	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{Q}_3^{(1,-1;a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{6} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{3} \\ 0 & 0 & 0 & 0 & -\frac{1}{3} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 \end{bmatrix}$
174	symmetry	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{Q}_{3,1}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{18} & 0 & -\frac{\sqrt{3}}{9} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{9} & 0 & \frac{\sqrt{6}}{18} & 0 \\ 0 & \frac{\sqrt{3}}{30} & 0 & 0 & -\frac{\sqrt{5}}{15} & 0 & \frac{\sqrt{2}}{5} & 0 & 0 & 0 \\ \frac{\sqrt{3}}{30} & 0 & -\frac{1}{10} & 0 & 0 & \frac{7\sqrt{3}}{45} & 0 & -\frac{\sqrt{6}}{45} & 0 & 0 \\ 0 & -\frac{1}{10} & 0 & \frac{\sqrt{3}}{30} & 0 & 0 & \frac{\sqrt{6}}{45} & 0 & -\frac{7\sqrt{3}}{45} & 0 \\ 0 & 0 & \frac{\sqrt{3}}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{5} & 0 & \frac{\sqrt{5}}{15} \end{bmatrix}$
175	symmetry	$-\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{Q}_{3,2}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{18} & 0 & \frac{\sqrt{3}i}{9} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{9} & 0 & -\frac{\sqrt{6}i}{18} & 0 \\ 0 & -\frac{\sqrt{3}i}{30} & 0 & 0 & -\frac{\sqrt{5}i}{15} & 0 & -\frac{\sqrt{2}i}{5} & 0 & 0 & 0 \\ \frac{\sqrt{3}i}{30} & 0 & \frac{i}{10} & 0 & 0 & \frac{7\sqrt{3}i}{45} & 0 & \frac{\sqrt{6}i}{45} & 0 & 0 \\ 0 & -\frac{i}{10} & 0 & -\frac{\sqrt{3}i}{30} & 0 & 0 & \frac{\sqrt{6}i}{45} & 0 & \frac{7\sqrt{3}i}{45} & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{5} & 0 & -\frac{\sqrt{5}i}{15} \end{bmatrix}$
176	symmetry	$\sqrt{15}xyz$
	$\mathbb{Q}_{3,1}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{18} & 0 & 0 & 0 & \frac{\sqrt{15}i}{18} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{18} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{18} \\ 0 & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{5}i}{15} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & -\frac{\sqrt{6}i}{9} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{45} & 0 \\ \frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{45} & 0 & 0 & 0 & \frac{\sqrt{6}i}{9} \\ 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & \frac{2\sqrt{5}i}{15} & 0 & 0 & 0 \end{bmatrix}$
177	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{Q}_{3,2}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{18} & 0 & 0 & 0 & -\frac{\sqrt{15}}{18} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{18} & 0 & 0 & 0 & \frac{\sqrt{3}}{18} \\ 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & \frac{2\sqrt{5}}{15} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{60} & -\frac{\sqrt{6}}{9} & 0 & 0 & 0 & \frac{\sqrt{30}}{45} & 0 \\ \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{45} & 0 & 0 & 0 & -\frac{\sqrt{6}}{9} \\ 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & \frac{2\sqrt{5}}{15} & 0 & 0 & 0 \end{bmatrix}$
178	symmetry	z
	$\mathbb{Q}_{1}^{(1,0;a)}(A_1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{3}}{5} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{10} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{15} & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{20} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{15} & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{20} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{5} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{10} & 0 \end{bmatrix}$
179	symmetry	x
	$\mathbb{Q}_{1,1}^{(1,0;a)}(E)$	$\begin{bmatrix} \frac{\sqrt{2}}{8} & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{5} & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{6}}{40} & 0 & 0 & 0 \\ \frac{1}{5} & 0 & \frac{2\sqrt{3}}{15} & 0 & 0 & -\frac{3}{20} & 0 & \frac{3\sqrt{2}}{40} & 0 & 0 \\ 0 & \frac{2\sqrt{3}}{15} & 0 & \frac{1}{5} & 0 & 0 & -\frac{3\sqrt{2}}{40} & 0 & \frac{3}{20} & 0 \\ 0 & 0 & \frac{1}{5} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{40} & 0 & \frac{\sqrt{15}}{20} \end{bmatrix}$
180	symmetry	y
	$\mathbb{Q}_{1,2}^{(1,0;a)}(E)$	$\begin{bmatrix} \frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{5} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{6}i}{40} & 0 & 0 & 0 \\ \frac{i}{5} & 0 & -\frac{2\sqrt{3}i}{15} & 0 & 0 & -\frac{3i}{20} & 0 & -\frac{3\sqrt{2}i}{40} & 0 & 0 \\ 0 & \frac{2\sqrt{3}i}{15} & 0 & -\frac{i}{5} & 0 & 0 & -\frac{3\sqrt{2}i}{40} & 0 & -\frac{3i}{20} & 0 \\ 0 & 0 & \frac{i}{5} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{40} & 0 & -\frac{\sqrt{15}i}{20} \end{bmatrix}$
181	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{Q}_3^{(1,0;a)}(A_1,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{3} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{3} & 0 & 0 \\ -\frac{\sqrt{3}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{30} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{5} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{30} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{5} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{30} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{30} & 0 \end{bmatrix}$
182	symmetry	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$
	$\mathbb{Q}_3^{(1,0;a)}(A_1,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{3} \\ 0 & 0 & 0 & 0 & -\frac{i}{3} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{120} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{24} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{24} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{120} & 0 & 0 & 0 & 0 \end{bmatrix}$
183	symmetry	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$
	$\mathbb{Q}_3^{(1,0;a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{3} \\ 0 & 0 & 0 & 0 & -\frac{1}{3} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{120} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{24} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{24} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{120} & 0 & 0 & 0 & 0 \end{bmatrix}$
184	symmetry	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{Q}_{3,1}^{(1,0;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{9} & 0 & -\frac{\sqrt{6}}{9} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{9} & 0 & \frac{\sqrt{3}}{9} & 0 \\ 0 & -\frac{\sqrt{6}}{15} & 0 & 0 & \frac{\sqrt{10}}{120} & 0 & -\frac{1}{20} & 0 & 0 & 0 \\ -\frac{\sqrt{6}}{15} & 0 & \frac{\sqrt{2}}{5} & 0 & 0 & -\frac{7\sqrt{6}}{360} & 0 & \frac{\sqrt{3}}{180} & 0 & 0 \\ 0 & \frac{\sqrt{2}}{5} & 0 & -\frac{\sqrt{6}}{15} & 0 & 0 & -\frac{\sqrt{3}}{180} & 0 & \frac{7\sqrt{6}}{360} & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{15} & 0 & 0 & 0 & 0 & \frac{1}{20} & 0 & -\frac{\sqrt{10}}{120} \end{bmatrix}$
185	symmetry	$-\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{Q}_{3,2}^{(1,0;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{9} & 0 & \frac{\sqrt{6}i}{9} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{9} & 0 & -\frac{\sqrt{3}i}{9} & 0 \\ 0 & \frac{\sqrt{6}i}{15} & 0 & 0 & \frac{\sqrt{10}i}{120} & 0 & \frac{i}{20} & 0 & 0 & 0 \\ -\frac{\sqrt{6}i}{15} & 0 & -\frac{\sqrt{2}i}{5} & 0 & 0 & -\frac{7\sqrt{6}i}{360} & 0 & -\frac{\sqrt{3}i}{180} & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{5} & 0 & \frac{\sqrt{6}i}{15} & 0 & 0 & -\frac{\sqrt{3}i}{180} & 0 & -\frac{7\sqrt{6}i}{360} & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{15} & 0 & 0 & 0 & 0 & \frac{i}{20} & 0 & \frac{\sqrt{10}i}{120} \end{bmatrix}$
186	symmetry	$\sqrt{15}xyz$
	$\mathbb{Q}_{3,1}^{(1,0;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{18} & 0 & 0 & 0 & \frac{\sqrt{30}i}{18} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{18} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{18} \\ 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{60} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{15} & \frac{\sqrt{3}i}{36} & 0 & 0 & 0 & \frac{\sqrt{15}i}{180} & 0 \\ -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{180} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{36} \\ 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{60} & 0 & 0 & 0 \end{bmatrix}$
187	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{Q}_{3,2}^{(1,0;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{18} & 0 & 0 & 0 & -\frac{\sqrt{30}}{18} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{18} & 0 & 0 & 0 & \frac{\sqrt{6}}{18} \\ 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{60} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}}{15} & \frac{\sqrt{3}}{36} & 0 & 0 & 0 & -\frac{\sqrt{15}}{180} & 0 \\ -\frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{180} & 0 & 0 & 0 & \frac{\sqrt{3}}{36} \\ 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{60} & 0 & 0 & 0 \end{bmatrix}$
188	symmetry	z
	$\mathbb{Q}_{1}^{(1,1;a)}(A_1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3}{10} & 0 & 0 & 0 & 0 & \frac{1}{10} & 0 & 0 & 0 & 0 \\ 0 & -\frac{1}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{20} & 0 & 0 & 0 \\ 0 & 0 & \frac{1}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{20} & 0 & 0 \\ 0 & 0 & 0 & \frac{3}{10} & 0 & 0 & 0 & 0 & \frac{1}{10} & 0 \end{bmatrix}$
189	symmetry	x

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{Q}_{1,1}^{(1,1;a)}(E)$	$\begin{bmatrix} \frac{\sqrt{6}}{8} & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{8} & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{10} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{2}}{40} & 0 & 0 & 0 \\ -\frac{\sqrt{3}}{10} & 0 & -\frac{1}{5} & 0 & 0 & -\frac{\sqrt{3}}{20} & 0 & \frac{\sqrt{6}}{40} & 0 & 0 \\ 0 & -\frac{1}{5} & 0 & -\frac{\sqrt{3}}{10} & 0 & 0 & -\frac{\sqrt{6}}{40} & 0 & \frac{\sqrt{3}}{20} & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{40} & 0 & \frac{\sqrt{5}}{20} \end{bmatrix}$
190	symmetry	y
	$\mathbb{Q}_{1,2}^{(1,1;a)}(E)$	$\begin{bmatrix} \frac{\sqrt{6}i}{8} & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{10} & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{2}i}{40} & 0 & 0 & 0 \\ -\frac{\sqrt{3}i}{10} & 0 & \frac{i}{5} & 0 & 0 & -\frac{\sqrt{3}i}{20} & 0 & -\frac{\sqrt{6}i}{40} & 0 & 0 \\ 0 & -\frac{i}{5} & 0 & \frac{\sqrt{3}i}{10} & 0 & 0 & -\frac{\sqrt{6}i}{40} & 0 & -\frac{\sqrt{3}i}{20} & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{40} & 0 & -\frac{\sqrt{5}i}{20} \end{bmatrix}$
191	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{G}_{2}^{(a)}(A_2)$	$\begin{bmatrix} 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{30} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{30} & 0 & 0 \\ -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{30} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 \end{bmatrix}$
192	symmetry	$\sqrt{3}yz$
	$\mathbb{G}_{2,1}^{(a)}(E,1)$	$\begin{bmatrix} \frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & \frac{\sqrt{5}}{15} & 0 & \frac{\sqrt{10}}{30} & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{10}}{30} & 0 & \frac{\sqrt{5}}{15} & 0 \\ 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 \\ \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{60} & 0 & \frac{\sqrt{5}}{12} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & -\frac{\sqrt{5}}{12} & 0 & \frac{\sqrt{10}}{60} & 0 \\ 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{6}}{12} \end{bmatrix}$
193	symmetry	$-\sqrt{3}xz$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{G}_{2,2}^{(a)}(E,1)$	$\begin{bmatrix} \frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & \frac{\sqrt{5}i}{15} & 0 & -\frac{\sqrt{10}i}{30} & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & \frac{\sqrt{10}i}{30} & 0 & -\frac{\sqrt{5}i}{15} & 0 \\ 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 \\ \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{60} & 0 & -\frac{\sqrt{5}i}{12} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & -\frac{\sqrt{5}i}{12} & 0 & -\frac{\sqrt{10}i}{60} & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{6}i}{12} \end{bmatrix}$
194	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{G}_{2,1}^{(a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & \frac{i}{6} & 0 & 0 & 0 & \frac{\sqrt{5}i}{30} & 0 \\ -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{30} & 0 & 0 & 0 & \frac{i}{6} \\ 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{30} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & -\frac{\sqrt{2}i}{6} & 0 & 0 & 0 & \frac{\sqrt{10}i}{15} & 0 \\ -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{15} & 0 & 0 & 0 & \frac{\sqrt{2}i}{6} \\ 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 & 0 \end{bmatrix}$
195	symmetry	$-\sqrt{3}xy$
	$\mathbb{G}_{2,2}^{(a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & \frac{1}{6} & 0 & 0 & 0 & -\frac{\sqrt{5}}{30} & 0 \\ -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{30} & 0 & 0 & 0 & -\frac{1}{6} \\ 0 & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{20} & -\frac{\sqrt{2}}{6} & 0 & 0 & 0 & -\frac{\sqrt{10}}{15} & 0 \\ -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{15} & 0 & 0 & 0 & -\frac{\sqrt{2}}{6} \\ 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 & 0 \end{bmatrix}$
196	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{G}_{2}^{(1,-1;a)}(A_2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{5} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{5} & 0 & 0 \\ \frac{i}{10} & 0 & 0 & 0 & 0 & \frac{3i}{10} & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{20} & 0 & 0 & 0 \\ 0 & 0 & -\frac{i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{20} & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{10} & 0 & 0 & 0 & 0 & -\frac{3i}{10} & 0 \end{bmatrix}$
197	symmetry	$\sqrt{3}yz$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} -\frac{\sqrt{2}}{40} & 0 & -\frac{\sqrt{6}}{40} & 0 & 0 & -\frac{\sqrt{2}}{5} & 0 & -\frac{1}{5} & 0 & 0 \\ 0 & \frac{\sqrt{6}}{40} & 0 & \frac{\sqrt{2}}{40} & 0 & 0 & -\frac{1}{5} & 0 & -\frac{\sqrt{2}}{5} & 0 \\ 0 & \frac{1}{10} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & \frac{3\sqrt{6}}{40} & 0 & 0 & 0 \\ -\frac{1}{10} & 0 & 0 & 0 & 0 & -\frac{1}{20} & 0 & \frac{\sqrt{2}}{8} & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{10} & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & \frac{1}{20} & 0 \\ 0 & 0 & \frac{1}{10} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{6}}{40} & 0 & -\frac{\sqrt{15}}{20} \end{bmatrix}$
198	symmetry	$-\sqrt{3}xz$
	$\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} -\frac{\sqrt{2}i}{40} & 0 & \frac{\sqrt{6}i}{40} & 0 & 0 & -\frac{\sqrt{2}i}{5} & 0 & \frac{i}{5} & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{40} & 0 & -\frac{\sqrt{2}i}{40} & 0 & 0 & -\frac{i}{5} & 0 & \frac{\sqrt{2}i}{5} & 0 \\ 0 & -\frac{i}{10} & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & -\frac{3\sqrt{6}i}{40} & 0 & 0 & 0 \\ -\frac{i}{10} & 0 & 0 & 0 & 0 & -\frac{i}{20} & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{10} & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & -\frac{i}{20} & 0 \\ 0 & 0 & \frac{i}{10} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{6}i}{40} & 0 & \frac{\sqrt{15}i}{20} \end{bmatrix}$
199	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}i}{20} & -\frac{\sqrt{10}i}{10} & 0 & 0 & 0 & -\frac{\sqrt{2}i}{10} & 0 \\ \frac{\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{10} & 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} \\ 0 & 0 & \frac{i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{20} & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{10} & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & \frac{i}{5} & 0 \\ \frac{i}{10} & 0 & 0 & 0 & 0 & -\frac{i}{5} & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} \\ 0 & \frac{i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{20} & 0 & 0 & 0 \end{bmatrix}$
200	symmetry	$-\sqrt{3}xy$
	$\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{2}}{20} & -\frac{\sqrt{10}}{10} & 0 & 0 & 0 & \frac{\sqrt{2}}{10} & 0 \\ \frac{\sqrt{2}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{10} & 0 & 0 & 0 & \frac{\sqrt{10}}{10} \\ 0 & 0 & -\frac{1}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{20} & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{10} & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & -\frac{1}{5} & 0 \\ \frac{1}{10} & 0 & 0 & 0 & 0 & -\frac{1}{5} & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & \frac{1}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{20} & 0 & 0 & 0 \end{bmatrix}$
201	symmetry	$\frac{\sqrt{70}xz\left(x^2-3y^2\right)}{4}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{G}_4^{(1,-1;a)}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{8} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{8} & 0 & 0 & 0 & 0 \end{bmatrix}$
202	symmetry	$\frac{3x^4}{8}+\frac{3x^2y^2}{4}-3x^2z^2+\frac{3y^4}{8}-3y^2z^2+z^4$
	$\mathbb{G}_4^{(1,-1;a)}(A_2,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 \end{bmatrix}$
203	symmetry	$\frac{\sqrt{70}yz\left(3x^2-y^2\right)}{4}$
	$\mathbb{G}_4^{(1,-1;a)}(A_2,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{8} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{8} & 0 & 0 & 0 & 0 \end{bmatrix}$
204	symmetry	$-\frac{\sqrt{10}yz\left(3x^2+3y^2-4z^2\right)}{4}$
	$\mathbb{G}_{4,1}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & \frac{\sqrt{105}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{28} & 0 & -\frac{\sqrt{210}}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & \frac{\sqrt{14}}{56} \end{bmatrix}$
205	symmetry	$\frac{\sqrt{10}xz\left(3x^2+3y^2-4z^2\right)}{4}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{G}_{4,2}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{56} & 0 & -\frac{\sqrt{105}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{28} & 0 & \frac{\sqrt{210}i}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & -\frac{\sqrt{14}i}{56} \end{bmatrix}$
206	symmetry	$\frac{\sqrt{35}\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$
	$\mathbb{G}_{4,1}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
207	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
	$\mathbb{G}_{4,2}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
208	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$
	$\mathbb{G}_{4,1}^{(1,-1;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & \frac{\sqrt{105}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 \end{bmatrix}$
209	symmetry	$\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{G}_{4,2}^{(1,-1;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & -\frac{\sqrt{105}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{28} & 0 & 0 & 0 & \frac{\sqrt{21}}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{28} & 0 & 0 & 0 \end{bmatrix}$
210	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{G}_{2}^{(1,0;a)}(A_2)$	$\begin{bmatrix} 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{5}i}{15} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{5}i}{15} & 0 & 0 \\ -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{60} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{60} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{30} & 0 \end{bmatrix}$
211	symmetry	$\sqrt{3}yz$
	$\mathbb{G}_{2,1}^{(1,0;a)}(E,1)$	$\begin{bmatrix} \frac{\sqrt{30}}{120} & 0 & \frac{\sqrt{10}}{40} & 0 & 0 & -\frac{2\sqrt{30}}{45} & 0 & -\frac{2\sqrt{15}}{45} & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{40} & 0 & -\frac{\sqrt{30}}{120} & 0 & 0 & -\frac{2\sqrt{15}}{45} & 0 & -\frac{2\sqrt{30}}{45} & 0 \\ 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & -\frac{1}{12} & 0 & -\frac{\sqrt{10}}{40} & 0 & 0 & 0 \\ \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{180} & 0 & -\frac{\sqrt{30}}{72} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & \frac{\sqrt{30}}{72} & 0 & -\frac{\sqrt{15}}{180} & 0 \\ 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{40} & 0 & \frac{1}{12} \end{bmatrix}$
212	symmetry	$-\sqrt{3}xz$
	$\mathbb{G}_{2,2}^{(1,0;a)}(E,1)$	$\begin{bmatrix} \frac{\sqrt{30}i}{120} & 0 & -\frac{\sqrt{10}i}{40} & 0 & 0 & -\frac{2\sqrt{30}i}{45} & 0 & \frac{2\sqrt{15}i}{45} & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{40} & 0 & \frac{\sqrt{30}i}{120} & 0 & 0 & -\frac{2\sqrt{15}i}{45} & 0 & \frac{2\sqrt{30}i}{45} & 0 \\ 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & -\frac{i}{12} & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 & 0 \\ \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{180} & 0 & \frac{\sqrt{30}i}{72} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & \frac{\sqrt{30}i}{72} & 0 & \frac{\sqrt{15}i}{180} & 0 \\ 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{40} & 0 & -\frac{i}{12} \end{bmatrix}$
213	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{G}_{2,1}^{(1,0;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & -\frac{\sqrt{6}i}{9} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{45} & 0 \\ -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{45} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{9} \\ 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{60} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{15} & \frac{\sqrt{3}i}{18} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{45} & 0 \\ -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{45} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{18} \\ 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{60} & 0 & 0 & 0 \end{bmatrix}$
214	symmetry	$-\sqrt{3}xy$
	$\mathbb{G}_{2,2}^{(1,0;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{30}}{60} & -\frac{\sqrt{6}}{9} & 0 & 0 & 0 & \frac{\sqrt{30}}{45} & 0 \\ -\frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{45} & 0 & 0 & 0 & \frac{\sqrt{6}}{9} \\ 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{60} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}}{15} & \frac{\sqrt{3}}{18} & 0 & 0 & 0 & \frac{\sqrt{15}}{45} & 0 \\ -\frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{45} & 0 & 0 & 0 & \frac{\sqrt{3}}{18} \\ 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{60} & 0 & 0 & 0 \end{bmatrix}$
215	symmetry	1
	$\mathbb{G}_{0}^{(1,1;a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
216	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{G}_{2}^{(1,1;a)}(A_2)$	$\begin{bmatrix} 0 & \frac{\sqrt{42}i}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{30} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}i}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{30} & 0 & 0 \\ \frac{\sqrt{21}i}{30} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{21}i}{105} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{105} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{21}i}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{105} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}i}{30} & 0 & 0 & 0 & 0 & \frac{2\sqrt{21}i}{105} & 0 \end{bmatrix}$
217	symmetry	$\sqrt{3}yz$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{G}_{2,1}^{(1,1;a)}(E,1)$	$\begin{bmatrix} \frac{\sqrt{42}}{30} & 0 & \frac{\sqrt{14}}{10} & 0 & 0 & -\frac{\sqrt{42}}{90} & 0 & -\frac{\sqrt{21}}{90} & 0 & 0 \\ 0 & -\frac{\sqrt{14}}{10} & 0 & -\frac{\sqrt{42}}{30} & 0 & 0 & -\frac{\sqrt{21}}{90} & 0 & -\frac{\sqrt{42}}{90} & 0 \\ 0 & \frac{\sqrt{21}}{30} & 0 & 0 & -\frac{\sqrt{35}}{105} & 0 & -\frac{\sqrt{14}}{70} & 0 & 0 & 0 \\ -\frac{\sqrt{21}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{315} & 0 & -\frac{\sqrt{42}}{126} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}}{30} & 0 & 0 & \frac{\sqrt{42}}{126} & 0 & -\frac{\sqrt{21}}{315} & 0 \\ 0 & 0 & \frac{\sqrt{21}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{70} & 0 & \frac{\sqrt{35}}{105} \end{bmatrix}$
218	symmetry	$-\sqrt{3}xz$
	$\mathbb{G}_{2,2}^{(1,1;a)}(E,1)$	$\begin{bmatrix} \frac{\sqrt{42}i}{30} & 0 & -\frac{\sqrt{14}i}{10} & 0 & 0 & -\frac{\sqrt{42}i}{90} & 0 & \frac{\sqrt{21}i}{90} & 0 & 0 \\ 0 & -\frac{\sqrt{14}i}{10} & 0 & \frac{\sqrt{42}i}{30} & 0 & 0 & -\frac{\sqrt{21}i}{90} & 0 & \frac{\sqrt{42}i}{90} & 0 \\ 0 & -\frac{\sqrt{21}i}{30} & 0 & 0 & -\frac{\sqrt{35}i}{105} & 0 & \frac{\sqrt{14}i}{70} & 0 & 0 & 0 \\ -\frac{\sqrt{21}i}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{315} & 0 & \frac{\sqrt{42}i}{126} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}i}{30} & 0 & 0 & \frac{\sqrt{42}i}{126} & 0 & \frac{\sqrt{21}i}{315} & 0 \\ 0 & 0 & \frac{\sqrt{21}i}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{70} & 0 & -\frac{\sqrt{35}i}{105} \end{bmatrix}$
219	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{G}_{2,1}^{(1,1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{42}i}{15} & -\frac{\sqrt{210}i}{180} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{180} & 0 \\ -\frac{\sqrt{42}i}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{180} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{180} \\ 0 & 0 & \frac{\sqrt{21}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{105} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}i}{30} & \frac{2\sqrt{105}i}{315} & 0 & 0 & 0 & -\frac{4\sqrt{21}i}{315} & 0 \\ \frac{\sqrt{21}i}{30} & 0 & 0 & 0 & 0 & \frac{4\sqrt{21}i}{315} & 0 & 0 & 0 & -\frac{2\sqrt{105}i}{315} \\ 0 & \frac{\sqrt{21}i}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{105} & 0 & 0 & 0 \end{bmatrix}$
220	symmetry	$-\sqrt{3}xy$
	$\mathbb{G}_{2,2}^{(1,1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{42}}{15} & -\frac{\sqrt{210}}{180} & 0 & 0 & 0 & \frac{\sqrt{42}}{180} & 0 \\ -\frac{\sqrt{42}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{180} & 0 & 0 & 0 & \frac{\sqrt{210}}{180} \\ 0 & 0 & -\frac{\sqrt{21}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{105} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}}{30} & \frac{2\sqrt{105}}{315} & 0 & 0 & 0 & \frac{4\sqrt{21}}{315} & 0 \\ \frac{\sqrt{21}}{30} & 0 & 0 & 0 & 0 & \frac{4\sqrt{21}}{315} & 0 & 0 & 0 & \frac{2\sqrt{105}}{315} \\ 0 & \frac{\sqrt{21}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{105} & 0 & 0 & 0 \end{bmatrix}$
221	symmetry	z

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{T}_1^{(a)}(A_1)$	$\begin{bmatrix} 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{10} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{60} & 0 & 0 & 0 & 0 & \frac{3i}{10} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{60} & 0 & 0 & 0 & 0 & \frac{3i}{10} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{10} & 0 \end{bmatrix}$
222	symmetry	x
	$\mathbb{T}_{1,1}^{(a)}(E)$	$\begin{bmatrix} -\frac{i}{4} & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{12} & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{20} & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & \frac{\sqrt{3}i}{20} & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{20} & 0 & -\frac{\sqrt{6}i}{30} & 0 & 0 & -\frac{3\sqrt{2}i}{20} & 0 & \frac{3i}{20} & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{30} & 0 & -\frac{\sqrt{2}i}{20} & 0 & 0 & -\frac{3i}{20} & 0 & \frac{3\sqrt{2}i}{20} & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{20} & 0 & \frac{\sqrt{30}i}{20} \end{bmatrix}$
223	symmetry	y
	$\mathbb{T}_{1,2}^{(a)}(E)$	$\begin{bmatrix} \frac{1}{4} & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{12} & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{20} & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{3}}{20} & 0 & 0 & 0 \\ \frac{\sqrt{2}}{20} & 0 & -\frac{\sqrt{6}}{30} & 0 & 0 & \frac{3\sqrt{2}}{20} & 0 & \frac{3}{20} & 0 & 0 \\ 0 & \frac{\sqrt{6}}{30} & 0 & -\frac{\sqrt{2}}{20} & 0 & 0 & \frac{3}{20} & 0 & \frac{3\sqrt{2}}{20} & 0 \\ 0 & 0 & \frac{\sqrt{2}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{20} & 0 & \frac{\sqrt{30}}{20} \end{bmatrix}$
224	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{T}_3^{(a)}(A_1,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 \\ \frac{i}{10} & 0 & 0 & 0 & 0 & -\frac{i}{5} & 0 & 0 & 0 & 0 \\ 0 & -\frac{3i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{15} & 0 & 0 & 0 \\ 0 & 0 & \frac{3i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{15} & 0 & 0 \\ 0 & 0 & 0 & -\frac{i}{10} & 0 & 0 & 0 & 0 & -\frac{i}{5} & 0 \end{bmatrix}$
225	symmetry	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{T}_3^{(a)}(A_1,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 \end{bmatrix}$
226	symmetry	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$
	$\mathbb{T}_3^{(a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 \end{bmatrix}$
227	symmetry	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{T}_{3,1}^{(a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{i}{6} & 0 & -\frac{\sqrt{2}i}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{6} & 0 & \frac{i}{6} & 0 \\ 0 & \frac{\sqrt{2}i}{10} & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & -\frac{\sqrt{3}i}{10} & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{10} & 0 & -\frac{\sqrt{6}i}{10} & 0 & 0 & -\frac{7\sqrt{2}i}{60} & 0 & \frac{i}{30} & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{10} & 0 & \frac{\sqrt{2}i}{10} & 0 & 0 & -\frac{i}{30} & 0 & \frac{7\sqrt{2}i}{60} & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{10} & 0 & -\frac{\sqrt{30}i}{60} \end{bmatrix}$
228	symmetry	$-\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{T}_{3,2}^{(a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{1}{6} & 0 & -\frac{\sqrt{2}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{6} & 0 & \frac{1}{6} & 0 \\ 0 & \frac{\sqrt{2}}{10} & 0 & 0 & -\frac{\sqrt{30}}{60} & 0 & -\frac{\sqrt{3}}{10} & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{10} & 0 & -\frac{\sqrt{6}}{10} & 0 & 0 & \frac{7\sqrt{2}}{60} & 0 & \frac{1}{30} & 0 & 0 \\ 0 & \frac{\sqrt{6}}{10} & 0 & \frac{\sqrt{2}}{10} & 0 & 0 & \frac{1}{30} & 0 & \frac{7\sqrt{2}}{60} & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{10} & 0 & -\frac{\sqrt{30}}{60} \end{bmatrix}$
229	symmetry	$\sqrt{15}xyz$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{T}^{(a)}_{3,1}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & 0 & -\frac{\sqrt{10}}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{12} & 0 & 0 & 0 & \frac{\sqrt{2}}{12} \\ 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & -\frac{1}{6} & 0 & 0 & 0 & -\frac{\sqrt{5}}{30} & 0 \\ -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{30} & 0 & 0 & 0 & \frac{1}{6} \\ 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{30} & 0 & 0 & 0 \end{bmatrix}$
230	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{T}^{(a)}_{3,2}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & 0 & -\frac{\sqrt{10}i}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{12} & 0 & 0 & 0 & \frac{\sqrt{2}i}{12} \\ 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{30} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & \frac{i}{6} & 0 & 0 & 0 & -\frac{\sqrt{5}i}{30} & 0 \\ \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{30} & 0 & 0 & 0 & \frac{i}{6} \\ 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{30} & 0 & 0 & 0 \end{bmatrix}$
231	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{T}^{(1,-1;a)}_{3}(A_1,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{6} & 0 & 0 \\ \frac{\sqrt{6}i}{60} & 0 & 0 & 0 & 0 & \frac{2\sqrt{6}i}{15} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{20} & 0 & 0 & 0 & 0 & -\frac{4i}{15} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{20} & 0 & 0 & 0 & 0 & -\frac{4i}{15} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{60} & 0 & 0 & 0 & 0 & \frac{2\sqrt{6}i}{15} & 0 \end{bmatrix}$
232	symmetry	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$
	$\mathbb{T}^{(1,-1;a)}_{3}(A_1,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{6} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{3} \\ 0 & 0 & 0 & 0 & \frac{1}{3} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 \end{bmatrix}$
233	symmetry	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{T}_3^{(1,-1;a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{6} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}i}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{15} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{3} \\ 0 & 0 & 0 & 0 & -\frac{i}{3} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{15}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 \end{bmatrix}$
234	symmetry	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{T}_{3,1}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{18} & 0 & -\frac{\sqrt{3}i}{9} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{9} & 0 & \frac{\sqrt{6}i}{18} & 0 \\ 0 & \frac{\sqrt{3}i}{30} & 0 & 0 & -\frac{\sqrt{5}i}{15} & 0 & \frac{\sqrt{2}i}{5} & 0 & 0 & 0 \\ \frac{\sqrt{3}i}{30} & 0 & -\frac{i}{10} & 0 & 0 & \frac{7\sqrt{3}i}{45} & 0 & -\frac{\sqrt{6}i}{45} & 0 & 0 \\ 0 & -\frac{i}{10} & 0 & \frac{\sqrt{3}i}{30} & 0 & 0 & \frac{\sqrt{6}i}{45} & 0 & -\frac{7\sqrt{3}i}{45} & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{5} & 0 & \frac{\sqrt{5}i}{15} \end{bmatrix}$
235	symmetry	$-\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{T}_{3,2}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{18} & 0 & -\frac{\sqrt{3}}{9} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{9} & 0 & \frac{\sqrt{6}}{18} & 0 \\ 0 & \frac{\sqrt{3}}{30} & 0 & 0 & \frac{\sqrt{5}}{15} & 0 & \frac{\sqrt{2}}{5} & 0 & 0 & 0 \\ -\frac{\sqrt{3}}{30} & 0 & -\frac{1}{10} & 0 & 0 & -\frac{7\sqrt{3}}{45} & 0 & -\frac{\sqrt{6}}{45} & 0 & 0 \\ 0 & \frac{1}{10} & 0 & \frac{\sqrt{3}}{30} & 0 & 0 & -\frac{\sqrt{6}}{45} & 0 & -\frac{7\sqrt{3}}{45} & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{5} & 0 & \frac{\sqrt{5}}{15} \end{bmatrix}$
236	symmetry	$\sqrt{15}xyz$
	$\mathbb{T}_{3,1}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{18} & 0 & 0 & 0 & -\frac{\sqrt{15}}{18} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{18} & 0 & 0 & 0 & \frac{\sqrt{3}}{18} \\ 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & \frac{2\sqrt{5}}{15} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{60} & \frac{\sqrt{6}}{9} & 0 & 0 & 0 & \frac{\sqrt{30}}{45} & 0 \\ -\frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{45} & 0 & 0 & 0 & -\frac{\sqrt{6}}{9} \\ 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{5}}{15} & 0 & 0 & 0 \end{bmatrix}$
237	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{T}_{3,2}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{18} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{18} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{18} & 0 & 0 & 0 & \frac{\sqrt{3}i}{18} \\ 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & \frac{2\sqrt{5}i}{15} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}i}{60} & -\frac{\sqrt{6}i}{9} & 0 & 0 & 0 & \frac{\sqrt{30}i}{45} & 0 \\ \frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{45} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{9} \\ 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & \frac{2\sqrt{5}i}{15} & 0 & 0 & 0 \end{bmatrix}$
238	symmetry	z
	$\mathbb{T}_{1}^{(1,0;a)}(A_1)$	$\begin{bmatrix} 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{3}i}{5} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{10} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{15} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{20} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{15} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{20} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{5} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{10} & 0 \end{bmatrix}$
239	symmetry	x
	$\mathbb{T}_{1,1}^{(1,0;a)}(E)$	$\begin{bmatrix} -\frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{5} & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{6}i}{40} & 0 & 0 & 0 \\ -\frac{i}{5} & 0 & -\frac{2\sqrt{3}i}{15} & 0 & 0 & \frac{3i}{20} & 0 & -\frac{3\sqrt{2}i}{40} & 0 & 0 \\ 0 & -\frac{2\sqrt{3}i}{15} & 0 & -\frac{i}{5} & 0 & 0 & \frac{3\sqrt{2}i}{40} & 0 & -\frac{3i}{20} & 0 \\ 0 & 0 & -\frac{i}{5} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{40} & 0 & -\frac{\sqrt{15}i}{20} \end{bmatrix}$
240	symmetry	y
	$\mathbb{T}_{1,2}^{(1,0;a)}(E)$	$\begin{bmatrix} \frac{\sqrt{2}}{8} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{1}{5} & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{6}}{40} & 0 & 0 & 0 \\ \frac{1}{5} & 0 & -\frac{2\sqrt{3}}{15} & 0 & 0 & -\frac{3}{20} & 0 & -\frac{3\sqrt{2}}{40} & 0 & 0 \\ 0 & \frac{2\sqrt{3}}{15} & 0 & -\frac{1}{5} & 0 & 0 & -\frac{3\sqrt{2}}{40} & 0 & -\frac{3}{20} & 0 \\ 0 & 0 & \frac{1}{5} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{40} & 0 & -\frac{\sqrt{15}}{20} \end{bmatrix}$
241	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{T}_3^{(1,0;a)}(A_1,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{3} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{3} & 0 & 0 \\ \frac{\sqrt{3}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{30} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{5} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{30} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{5} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{30} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{30} & 0 \end{bmatrix}$
242	symmetry	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$
	$\mathbb{T}_3^{(1,0;a)}(A_1,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{3} \\ 0 & 0 & 0 & 0 & -\frac{1}{3} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{120} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{24} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{24} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{120} & 0 & 0 & 0 & 0 \end{bmatrix}$
243	symmetry	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$
	$\mathbb{T}_3^{(1,0;a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{3} \\ 0 & 0 & 0 & 0 & \frac{i}{3} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{120} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{24} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{24} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{30}i}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{120} & 0 & 0 & 0 & 0 \end{bmatrix}$
244	symmetry	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{T}_{3,1}^{(1,0;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{9} & 0 & \frac{\sqrt{6}i}{9} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{9} & 0 & -\frac{\sqrt{3}i}{9} & 0 \\ 0 & \frac{\sqrt{6}i}{15} & 0 & 0 & -\frac{\sqrt{10}i}{120} & 0 & \frac{i}{20} & 0 & 0 & 0 \\ \frac{\sqrt{6}i}{15} & 0 & -\frac{\sqrt{2}i}{5} & 0 & 0 & \frac{7\sqrt{6}i}{360} & 0 & -\frac{\sqrt{3}i}{180} & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{5} & 0 & \frac{\sqrt{6}i}{15} & 0 & 0 & \frac{\sqrt{3}i}{180} & 0 & -\frac{7\sqrt{6}i}{360} & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{15} & 0 & 0 & 0 & 0 & -\frac{i}{20} & 0 & \frac{\sqrt{10}i}{120} \end{bmatrix}$
245	symmetry	$-\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{T}^{(1,0;a)}_{3,2}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{9} & 0 & \frac{\sqrt{6}}{9} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{9} & 0 & -\frac{\sqrt{3}}{9} & 0 \\ 0 & \frac{\sqrt{6}}{15} & 0 & 0 & \frac{\sqrt{10}}{120} & 0 & \frac{1}{20} & 0 & 0 & 0 \\ -\frac{\sqrt{6}}{15} & 0 & -\frac{\sqrt{2}}{5} & 0 & 0 & -\frac{7\sqrt{6}}{360} & 0 & -\frac{\sqrt{3}}{180} & 0 & 0 \\ 0 & \frac{\sqrt{2}}{5} & 0 & \frac{\sqrt{6}}{15} & 0 & 0 & -\frac{\sqrt{3}}{180} & 0 & -\frac{7\sqrt{6}}{360} & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{15} & 0 & 0 & 0 & 0 & \frac{1}{20} & 0 & \frac{\sqrt{10}}{120} \end{bmatrix}$
246	symmetry	$\sqrt{15}xyz$
	$\mathbb{T}^{(1,0;a)}_{3,1}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{18} & 0 & 0 & 0 & \frac{\sqrt{30}}{18} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{18} & 0 & 0 & 0 & -\frac{\sqrt{6}}{18} \\ 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{60} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{15} & \frac{\sqrt{3}}{36} & 0 & 0 & 0 & \frac{\sqrt{15}}{180} & 0 \\ -\frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{180} & 0 & 0 & 0 & -\frac{\sqrt{3}}{36} \\ 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{60} & 0 & 0 & 0 \end{bmatrix}$
247	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{T}^{(1,0;a)}_{3,2}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{18} & 0 & 0 & 0 & \frac{\sqrt{30}i}{18} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{18} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{18} \\ 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{60} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{15} & -\frac{\sqrt{3}i}{36} & 0 & 0 & 0 & \frac{\sqrt{15}i}{180} & 0 \\ \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{180} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{36} \\ 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{60} & 0 & 0 & 0 \end{bmatrix}$
248	symmetry	z
	$\mathbb{T}^{(1,1;a)}_{1}(A_1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3i}{10} & 0 & 0 & 0 & 0 & \frac{i}{10} & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{20} & 0 & 0 & 0 \\ 0 & 0 & \frac{i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{20} & 0 & 0 \\ 0 & 0 & 0 & \frac{3i}{10} & 0 & 0 & 0 & 0 & \frac{i}{10} & 0 \end{bmatrix}$
249	symmetry	x

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{T}_{1,1}^{(1,1;a)}(E)$	$\begin{bmatrix} \frac{\sqrt{6}i}{8} & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{8} & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{10} & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{2}i}{40} & 0 & 0 & 0 \\ -\frac{\sqrt{3}i}{10} & 0 & -\frac{i}{5} & 0 & 0 & -\frac{\sqrt{3}i}{20} & 0 & \frac{\sqrt{6}i}{40} & 0 & 0 \\ 0 & -\frac{i}{5} & 0 & -\frac{\sqrt{3}i}{10} & 0 & 0 & -\frac{\sqrt{6}i}{40} & 0 & \frac{\sqrt{3}i}{20} & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{40} & 0 & \frac{\sqrt{5}i}{20} \end{bmatrix}$
250	symmetry	y
	$\mathbb{T}_{1,2}^{(1,1;a)}(E)$	$\begin{bmatrix} -\frac{\sqrt{6}}{8} & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{8} & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{10} & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{2}}{40} & 0 & 0 & 0 \\ \frac{\sqrt{3}}{10} & 0 & -\frac{1}{5} & 0 & 0 & \frac{\sqrt{3}}{20} & 0 & \frac{\sqrt{6}}{40} & 0 & 0 \\ 0 & \frac{1}{5} & 0 & -\frac{\sqrt{3}}{10} & 0 & 0 & \frac{\sqrt{6}}{40} & 0 & \frac{\sqrt{3}}{20} & 0 \\ 0 & 0 & \frac{\sqrt{3}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{40} & 0 & \frac{\sqrt{5}}{20} \end{bmatrix}$
251	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{M}_{2}^{(a)}(A_2)$	$\begin{bmatrix} 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{30} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{30} & 0 & 0 \\ -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{30} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{10} & 0 \end{bmatrix}$
252	symmetry	$\sqrt{3}yz$
	$\mathbb{M}_{2,1}^{(a)}(E,1)$	$\begin{bmatrix} -\frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{\sqrt{5}i}{15} & 0 & -\frac{\sqrt{10}i}{30} & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{10}i}{30} & 0 & -\frac{\sqrt{5}i}{15} & 0 \\ 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 \\ -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{60} & 0 & -\frac{\sqrt{5}i}{12} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & \frac{\sqrt{5}i}{12} & 0 & -\frac{\sqrt{10}i}{60} & 0 \\ 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{6}i}{12} \end{bmatrix}$
253	symmetry	$-\sqrt{3}xz$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{M}^{(a)}_{2,2}(E,1)$	$\begin{bmatrix} \frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & \frac{\sqrt{5}}{15} & 0 & -\frac{\sqrt{10}}{30} & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{10}}{30} & 0 & -\frac{\sqrt{5}}{15} & 0 \\ 0 & \frac{\sqrt{10}}{20} & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 \\ \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{60} & 0 & -\frac{\sqrt{5}}{12} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & -\frac{\sqrt{5}}{12} & 0 & -\frac{\sqrt{10}}{60} & 0 \\ 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{6}}{12} \end{bmatrix}$
254	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{M}^{(a)}_{2,1}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{5}}{10} & \frac{1}{6} & 0 & 0 & 0 & \frac{\sqrt{5}}{30} & 0 \\ -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{30} & 0 & 0 & 0 & \frac{1}{6} \\ 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{30} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & -\frac{\sqrt{2}}{6} & 0 & 0 & 0 & \frac{\sqrt{10}}{15} & 0 \\ -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{15} & 0 & 0 & 0 & \frac{\sqrt{2}}{6} \\ 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 & 0 \end{bmatrix}$
255	symmetry	$-\sqrt{3}xy$
	$\mathbb{M}^{(a)}_{2,2}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & -\frac{i}{6} & 0 & 0 & 0 & \frac{\sqrt{5}i}{30} & 0 \\ \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{30} & 0 & 0 & 0 & \frac{i}{6} \\ 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{30} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & \frac{\sqrt{2}i}{6} & 0 & 0 & 0 & \frac{\sqrt{10}i}{15} & 0 \\ \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{15} & 0 & 0 & 0 & \frac{\sqrt{2}i}{6} \\ 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{30} & 0 & 0 & 0 \end{bmatrix}$
256	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{M}^{(1,-1;a)}_{2}(A_2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{2}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{5} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{5} & 0 & 0 \\ \frac{1}{10} & 0 & 0 & 0 & 0 & \frac{3}{10} & 0 & 0 & 0 & 0 \\ 0 & -\frac{1}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{20} & 0 & 0 & 0 \\ 0 & 0 & -\frac{1}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{20} & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{10} & 0 & 0 & 0 & 0 & -\frac{3}{10} & 0 \end{bmatrix}$
257	symmetry	$\sqrt{3}yz$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{M}_{2,1}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} \frac{\sqrt{2}i}{40} & 0 & \frac{\sqrt{6}i}{40} & 0 & 0 & \frac{\sqrt{2}i}{5} & 0 & \frac{i}{5} & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{40} & 0 & -\frac{\sqrt{2}i}{40} & 0 & 0 & \frac{i}{5} & 0 & \frac{\sqrt{2}i}{5} & 0 \\ 0 & -\frac{i}{10} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & -\frac{3\sqrt{6}i}{40} & 0 & 0 & 0 \\ \frac{i}{10} & 0 & 0 & 0 & 0 & \frac{i}{20} & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{10} & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & -\frac{i}{20} & 0 \\ 0 & 0 & -\frac{i}{10} & 0 & 0 & 0 & 0 & \frac{3\sqrt{6}i}{40} & 0 & \frac{\sqrt{15}i}{20} \end{bmatrix}$
258	symmetry	$-\sqrt{3}xz$
	$\mathbb{M}_{2,2}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} -\frac{\sqrt{2}}{40} & 0 & \frac{\sqrt{6}}{40} & 0 & 0 & -\frac{\sqrt{2}}{5} & 0 & \frac{1}{5} & 0 & 0 \\ 0 & \frac{\sqrt{6}}{40} & 0 & -\frac{\sqrt{2}}{40} & 0 & 0 & -\frac{1}{5} & 0 & \frac{\sqrt{2}}{5} & 0 \\ 0 & -\frac{1}{10} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & -\frac{3\sqrt{6}}{40} & 0 & 0 & 0 \\ -\frac{1}{10} & 0 & 0 & 0 & 0 & -\frac{1}{20} & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{10} & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & -\frac{1}{20} & 0 \\ 0 & 0 & \frac{1}{10} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{6}}{40} & 0 & \frac{\sqrt{15}}{20} \end{bmatrix}$
259	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{M}_{2,1}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}}{20} & -\frac{\sqrt{10}}{10} & 0 & 0 & 0 & -\frac{\sqrt{2}}{10} & 0 \\ \frac{\sqrt{2}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{10} & 0 & 0 & 0 & -\frac{\sqrt{10}}{10} \\ 0 & 0 & \frac{1}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{20} & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{10} & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & \frac{1}{5} & 0 \\ \frac{1}{10} & 0 & 0 & 0 & 0 & -\frac{1}{5} & 0 & 0 & 0 & \frac{\sqrt{5}}{10} \\ 0 & \frac{1}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{20} & 0 & 0 & 0 \end{bmatrix}$
260	symmetry	$-\sqrt{3}xy$
	$\mathbb{M}_{2,2}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}i}{20} & \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & -\frac{\sqrt{2}i}{10} & 0 \\ -\frac{\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{10} & 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} \\ 0 & 0 & \frac{i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{20} & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{10} & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & \frac{i}{5} & 0 \\ -\frac{i}{10} & 0 & 0 & 0 & 0 & \frac{i}{5} & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} \\ 0 & -\frac{i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{20} & 0 & 0 & 0 \end{bmatrix}$
261	symmetry	$\frac{\sqrt{70}xz\left(x^2-3y^2\right)}{4}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{M}_4^{(1,-1;a)}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{8} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{8} & 0 & 0 & 0 & 0 \end{bmatrix}$
262	symmetry	$\frac{3x^4}{8}+\frac{3x^2y^2}{4}-3x^2z^2+\frac{3y^4}{8}-3y^2z^2+z^4$
	$\mathbb{M}_4^{(1,-1;a)}(A_2,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 \end{bmatrix}$
263	symmetry	$\frac{\sqrt{70}yz\left(3x^2-y^2\right)}{4}$
	$\mathbb{M}_4^{(1,-1;a)}(A_2,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{8} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{8} & 0 & 0 & 0 & 0 \end{bmatrix}$
264	symmetry	$-\frac{\sqrt{10}yz\left(3x^2+3y^2-4z^2\right)}{4}$
	$\mathbb{M}_{4,1}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{56} & 0 & -\frac{\sqrt{105}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{28} & 0 & \frac{\sqrt{210}i}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & -\frac{\sqrt{14}i}{56} \end{bmatrix}$
265	symmetry	$\frac{\sqrt{10}xz\left(3x^2+3y^2-4z^2\right)}{4}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{M}_{4,2}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & -\frac{\sqrt{105}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{28} & 0 & \frac{\sqrt{210}}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & -\frac{\sqrt{14}}{56} \end{bmatrix}$
266	symmetry	$\frac{\sqrt{35}\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$
	$\mathbb{M}_{4,1}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
267	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
	$\mathbb{M}_{4,2}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
268	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$
	$\mathbb{M}_{4,1}^{(1,-1;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & \frac{\sqrt{105}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{28} & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{28} & 0 & 0 & 0 \end{bmatrix}$
269	symmetry	$\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{M}_{4,2}^{(1,-1;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & \frac{\sqrt{105}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 & 0 \end{bmatrix}$
270	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{M}_{2}^{(1,0;a)}(A_2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & \frac{2\sqrt{5}}{15} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & \frac{2\sqrt{5}}{15} & 0 & 0 \\ \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{60} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{60} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 \end{bmatrix}$
271	symmetry	$\sqrt{3}yz$
	$\mathbb{M}_{2,1}^{(1,0;a)}(E,1)$	$\begin{bmatrix} \frac{\sqrt{30}i}{120} & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 & -\frac{2\sqrt{30}i}{45} & 0 & -\frac{2\sqrt{15}i}{45} & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{40} & 0 & -\frac{\sqrt{30}i}{120} & 0 & 0 & -\frac{2\sqrt{15}i}{45} & 0 & -\frac{2\sqrt{30}i}{45} & 0 \\ 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & -\frac{i}{12} & 0 & -\frac{\sqrt{10}i}{40} & 0 & 0 & 0 \\ \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{180} & 0 & -\frac{\sqrt{30}i}{72} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & \frac{\sqrt{30}i}{72} & 0 & -\frac{\sqrt{15}i}{180} & 0 \\ 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{40} & 0 & \frac{i}{12} \end{bmatrix}$
272	symmetry	$-\sqrt{3}xz$
	$\mathbb{M}_{2,2}^{(1,0;a)}(E,1)$	$\begin{bmatrix} -\frac{\sqrt{30}}{120} & 0 & \frac{\sqrt{10}}{40} & 0 & 0 & \frac{2\sqrt{30}}{45} & 0 & -\frac{2\sqrt{15}}{45} & 0 & 0 \\ 0 & \frac{\sqrt{10}}{40} & 0 & -\frac{\sqrt{30}}{120} & 0 & 0 & \frac{2\sqrt{15}}{45} & 0 & -\frac{2\sqrt{30}}{45} & 0 \\ 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & \frac{1}{12} & 0 & -\frac{\sqrt{10}}{40} & 0 & 0 & 0 \\ -\frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{180} & 0 & -\frac{\sqrt{30}}{72} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & -\frac{\sqrt{30}}{72} & 0 & -\frac{\sqrt{15}}{180} & 0 \\ 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{40} & 0 & \frac{1}{12} \end{bmatrix}$
273	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{M}_{2,1}^{(1,0;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{30}}{60} & \frac{\sqrt{6}}{9} & 0 & 0 & 0 & \frac{\sqrt{30}}{45} & 0 \\ \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{45} & 0 & 0 & 0 & \frac{\sqrt{6}}{9} \\ 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{60} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}}{15} & -\frac{\sqrt{3}}{18} & 0 & 0 & 0 & \frac{\sqrt{15}}{45} & 0 \\ \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{45} & 0 & 0 & 0 & \frac{\sqrt{3}}{18} \\ 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{60} & 0 & 0 & 0 \end{bmatrix}$
274	symmetry	$-\sqrt{3}xy$
	$\mathbb{M}_{2,2}^{(1,0;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{30}i}{60} & -\frac{\sqrt{6}i}{9} & 0 & 0 & 0 & \frac{\sqrt{30}i}{45} & 0 \\ -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{45} & 0 & 0 & 0 & \frac{\sqrt{6}i}{9} \\ 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{60} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}i}{15} & \frac{\sqrt{3}i}{18} & 0 & 0 & 0 & \frac{\sqrt{15}i}{45} & 0 \\ -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{45} & 0 & 0 & 0 & \frac{\sqrt{3}i}{18} \\ 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{60} & 0 & 0 & 0 \end{bmatrix}$
275	symmetry	1
	$\mathbb{M}_{0}^{(1,1;a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
276	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{M}_{2}^{(1,1;a)}(A_2)$	$\begin{bmatrix} 0 & \frac{\sqrt{42}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{30} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{30} & 0 & 0 \\ \frac{\sqrt{21}}{30} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{21}}{105} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{105} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{21}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{105} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}}{30} & 0 & 0 & 0 & 0 & \frac{2\sqrt{21}}{105} & 0 \end{bmatrix}$
277	symmetry	$\sqrt{3}yz$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{M}_{2,1}^{(1,1;a)}(E,1)$	$\begin{bmatrix} -\frac{\sqrt{42}i}{30} & 0 & -\frac{\sqrt{14}i}{10} & 0 & 0 & \frac{\sqrt{42}i}{90} & 0 & \frac{\sqrt{21}i}{90} & 0 & 0 \\ 0 & \frac{\sqrt{14}i}{10} & 0 & \frac{\sqrt{42}i}{30} & 0 & 0 & \frac{\sqrt{21}i}{90} & 0 & \frac{\sqrt{42}i}{90} & 0 \\ 0 & -\frac{\sqrt{21}i}{30} & 0 & 0 & \frac{\sqrt{35}i}{105} & 0 & \frac{\sqrt{14}i}{70} & 0 & 0 & 0 \\ \frac{\sqrt{21}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{315} & 0 & \frac{\sqrt{42}i}{126} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}i}{30} & 0 & 0 & -\frac{\sqrt{42}i}{126} & 0 & \frac{\sqrt{21}i}{315} & 0 \\ 0 & 0 & -\frac{\sqrt{21}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{70} & 0 & -\frac{\sqrt{35}i}{105} \end{bmatrix}$
278	symmetry	$-\sqrt{3}xz$
	$\mathbb{M}_{2,2}^{(1,1;a)}(E,1)$	$\begin{bmatrix} \frac{\sqrt{42}}{30} & 0 & -\frac{\sqrt{14}}{10} & 0 & 0 & -\frac{\sqrt{42}}{90} & 0 & \frac{\sqrt{21}}{90} & 0 & 0 \\ 0 & -\frac{\sqrt{14}}{10} & 0 & \frac{\sqrt{42}}{30} & 0 & 0 & -\frac{\sqrt{21}}{90} & 0 & \frac{\sqrt{42}}{90} & 0 \\ 0 & -\frac{\sqrt{21}}{30} & 0 & 0 & -\frac{\sqrt{35}}{105} & 0 & \frac{\sqrt{14}}{70} & 0 & 0 & 0 \\ -\frac{\sqrt{21}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{315} & 0 & \frac{\sqrt{42}}{126} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}}{30} & 0 & 0 & \frac{\sqrt{42}}{126} & 0 & \frac{\sqrt{21}}{315} & 0 \\ 0 & 0 & \frac{\sqrt{21}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{70} & 0 & -\frac{\sqrt{35}}{105} \end{bmatrix}$
279	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{M}_{2,1}^{(1,1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{42}}{15} & -\frac{\sqrt{210}}{180} & 0 & 0 & 0 & -\frac{\sqrt{42}}{180} & 0 \\ -\frac{\sqrt{42}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{180} & 0 & 0 & 0 & -\frac{\sqrt{210}}{180} \\ 0 & 0 & \frac{\sqrt{21}}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{105} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}}{30} & \frac{2\sqrt{105}}{315} & 0 & 0 & 0 & -\frac{4\sqrt{21}}{315} & 0 \\ \frac{\sqrt{21}}{30} & 0 & 0 & 0 & 0 & \frac{4\sqrt{21}}{315} & 0 & 0 & 0 & -\frac{2\sqrt{105}}{315} \\ 0 & \frac{\sqrt{21}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{105} & 0 & 0 & 0 \end{bmatrix}$
280	symmetry	$-\sqrt{3}xy$
	$\mathbb{M}_{2,2}^{(1,1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{42}i}{15} & \frac{\sqrt{210}i}{180} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{180} & 0 \\ \frac{\sqrt{42}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{180} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{180} \\ 0 & 0 & \frac{\sqrt{21}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{105} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}i}{30} & -\frac{2\sqrt{105}i}{315} & 0 & 0 & 0 & -\frac{4\sqrt{21}i}{315} & 0 \\ -\frac{\sqrt{21}i}{30} & 0 & 0 & 0 & 0 & -\frac{4\sqrt{21}i}{315} & 0 & 0 & 0 & -\frac{2\sqrt{105}i}{315} \\ 0 & -\frac{\sqrt{21}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{105} & 0 & 0 & 0 \end{bmatrix}$

bra: $= \langle \frac{1}{2}, \frac{1}{2}; p|\,, \langle \frac{1}{2}, -\frac{1}{2}; p|\,, \langle \frac{3}{2}, \frac{3}{2}; p|\,, \langle \frac{3}{2}, \frac{1}{2}; p|\,, \langle \frac{3}{2}, -\frac{1}{2}; p|\,, \langle \frac{3}{2}, -\frac{3}{2}; p|$
ket: $= |\frac{5}{2}, \frac{5}{2}; f\rangle\,, |\frac{5}{2}, \frac{3}{2}; f\rangle\,, |\frac{5}{2}, \frac{1}{2}; f\rangle\,, |\frac{5}{2}, -\frac{1}{2}; f\rangle\,, |\frac{5}{2}, -\frac{3}{2}; f\rangle\,, |\frac{5}{2}, -\frac{5}{2}; f\rangle\,, |\frac{7}{2}, \frac{7}{2}; f\rangle\,, |\frac{7}{2}, \frac{5}{2}; f\rangle\,, |\frac{7}{2}, \frac{3}{2}; f\rangle\,, |\frac{7}{2}, \frac{1}{2}; f\rangle\,, |\frac{7}{2}, -\frac{1}{2}; f\rangle\,, |\frac{7}{2}, -\frac{3}{2}; f\rangle\,, |\frac{7}{2}, -\frac{5}{2}; f\rangle\,, |\frac{7}{2}, -\frac{7}{2}; f\rangle$

Table 7: (p,f) block.

No.	multipole	matrix
281	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{Q}_2^{(a)}(A_1)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{1}{7} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{1}{7} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{14} & 0 & 0 \end{bmatrix}$
282	symmetry	$\sqrt{3}xz$
	$\mathbb{Q}_{2,1}^{(a)}(E,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{2}}{6} & 0 & \frac{1}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{1}{6} & 0 & \frac{\sqrt{2}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{15}}{42} & 0 & -\frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{14} & 0 & \frac{\sqrt{2}}{14} & 0 & 0 & 0 & 0 \\ 0 & -\frac{1}{42} & 0 & -\frac{5\sqrt{2}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{14} & 0 & \frac{\sqrt{6}}{14} & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{2}}{84} & 0 & -\frac{1}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{14} & 0 & \frac{\sqrt{10}}{14} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & \frac{\sqrt{15}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{14} & 0 & \frac{\sqrt{10}}{14} & 0 \end{bmatrix}$
283	symmetry	$\sqrt{3}yz$
	$\mathbb{Q}_{2,2}^{(a)}(E,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{2}i}{6} & 0 & -\frac{i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{i}{6} & 0 & -\frac{\sqrt{2}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{15}i}{42} & 0 & \frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{14} & 0 & -\frac{\sqrt{2}i}{14} & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{42} & 0 & \frac{5\sqrt{2}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{14} & 0 & -\frac{\sqrt{6}i}{14} & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{2}i}{84} & 0 & \frac{i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{14} & 0 & -\frac{\sqrt{10}i}{14} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{28} & 0 & -\frac{\sqrt{15}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{14} & 0 & -\frac{\sqrt{10}i}{14} & 0 \end{bmatrix}$
284	symmetry	$\sqrt{3}xy$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_{2,1}^{(a)}(E,2)$	$\begin{bmatrix} \frac{\sqrt{10}i}{12} & 0 & 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & 0 & -\frac{\sqrt{10}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{42} & 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{2}i}{28} & 0 & 0 & 0 \\ \frac{\sqrt{5}i}{21} & 0 & 0 & 0 & \frac{2i}{21} & 0 & 0 & \frac{\sqrt{30}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{10}i}{28} & 0 & 0 \\ 0 & \frac{2i}{21} & 0 & 0 & 0 & \frac{\sqrt{5}i}{21} & 0 & 0 & \frac{\sqrt{10}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{28} & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} \end{bmatrix}$
285	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{Q}_{2,2}^{(a)}(E,2)$	$\begin{bmatrix} \frac{\sqrt{10}}{12} & 0 & 0 & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{12} & 0 & 0 & 0 & \frac{\sqrt{10}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{42} & 0 & 0 & \frac{\sqrt{70}}{28} & 0 & 0 & 0 & \frac{\sqrt{2}}{28} & 0 & 0 & 0 \\ \frac{\sqrt{5}}{21} & 0 & 0 & 0 & -\frac{2}{21} & 0 & 0 & \frac{\sqrt{30}}{28} & 0 & 0 & 0 & \frac{\sqrt{10}}{28} & 0 & 0 \\ 0 & \frac{2}{21} & 0 & 0 & 0 & -\frac{\sqrt{5}}{21} & 0 & 0 & \frac{\sqrt{10}}{28} & 0 & 0 & 0 & \frac{\sqrt{30}}{28} & 0 \\ 0 & 0 & \frac{\sqrt{6}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{28} & 0 & 0 & 0 & \frac{\sqrt{70}}{28} \end{bmatrix}$
286	symmetry	$\frac{3x^4}{8}+\frac{3x^2y^2}{4}-3x^2z^2+\frac{3y^4}{8}-3y^2z^2+z^4$
	$\mathbb{Q}_4^{(a)}(A_1,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{2}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{2}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{28} & 0 & 0 \end{bmatrix}$
287	symmetry	$\frac{\sqrt{70}yz\left(3x^2-y^2\right)}{4}$
	$\mathbb{Q}_4^{(a)}(A_1,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{24} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}i}{56} & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 \\ -\frac{3\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} \\ 0 & \frac{\sqrt{210}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
288	symmetry	$\frac{\sqrt{70}xz\left(x^2-3y^2\right)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_4^{(a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{24} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{24} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{56} & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 \\ -\frac{3\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} \\ 0 & \frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
289	symmetry	$-\frac{\sqrt{10}xz\left(3x^2+3y^2-4z^2\right)}{4}$
	$\mathbb{Q}_{4,1}^{(a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{24} & 0 & \frac{\sqrt{2}}{8} & 0 & 0 \\ -\frac{\sqrt{6}}{56} & 0 & \frac{\sqrt{15}}{28} & 0 & 0 & 0 & 0 & \frac{3}{28} & 0 & -\frac{\sqrt{5}}{14} & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{10}}{56} & 0 & -\frac{3\sqrt{5}}{28} & 0 & 0 & 0 & 0 & -\frac{1}{7} & 0 & \frac{\sqrt{15}}{84} & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{5}}{28} & 0 & \frac{3\sqrt{10}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{84} & 0 & \frac{1}{7} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}}{28} & 0 & -\frac{\sqrt{6}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{14} & 0 & -\frac{3}{28} & 0 \end{bmatrix}$
290	symmetry	$-\frac{\sqrt{10}yz\left(3x^2+3y^2-4z^2\right)}{4}$
	$\mathbb{Q}_{4,2}^{(a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 \\ -\frac{\sqrt{6}i}{56} & 0 & -\frac{\sqrt{15}i}{28} & 0 & 0 & 0 & 0 & \frac{3i}{28} & 0 & \frac{\sqrt{5}i}{14} & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{10}i}{56} & 0 & \frac{3\sqrt{5}i}{28} & 0 & 0 & 0 & 0 & -\frac{i}{7} & 0 & -\frac{\sqrt{15}i}{84} & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{5}i}{28} & 0 & -\frac{3\sqrt{10}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{84} & 0 & -\frac{i}{7} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}i}{28} & 0 & \frac{\sqrt{6}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{14} & 0 & \frac{3i}{28} & 0 \end{bmatrix}$
291	symmetry	$-\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
	$\mathbb{Q}_{4,1}^{(a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
292	symmetry	$\frac{\sqrt{35}\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_{4,2}^{(a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
293	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$
	$\mathbb{Q}_{4,1}^{(a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}i}{28} & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & \frac{3\sqrt{10}i}{56} & 0 & 0 & 0 \\ -\frac{3i}{28} & 0 & 0 & 0 & \frac{3\sqrt{5}i}{28} & 0 & 0 & \frac{11\sqrt{6}i}{168} & 0 & 0 & 0 & \frac{\sqrt{2}i}{56} & 0 & 0 \\ 0 & \frac{3\sqrt{5}i}{28} & 0 & 0 & 0 & -\frac{3i}{28} & 0 & 0 & -\frac{\sqrt{2}i}{56} & 0 & 0 & 0 & -\frac{11\sqrt{6}i}{168} & 0 \\ 0 & 0 & -\frac{\sqrt{30}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{56} & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} \end{bmatrix}$
294	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$
	$\mathbb{Q}_{4,2}^{(a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}}{28} & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & -\frac{3\sqrt{10}}{56} & 0 & 0 & 0 \\ -\frac{3}{28} & 0 & 0 & 0 & -\frac{3\sqrt{5}}{28} & 0 & 0 & \frac{11\sqrt{6}}{168} & 0 & 0 & 0 & -\frac{\sqrt{2}}{56} & 0 & 0 \\ 0 & \frac{3\sqrt{5}}{28} & 0 & 0 & 0 & \frac{3}{28} & 0 & 0 & -\frac{\sqrt{2}}{56} & 0 & 0 & 0 & \frac{11\sqrt{6}}{168} & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{56} & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} \end{bmatrix}$
295	symmetry	$\frac{3x^4}{8}+\frac{3x^2y^2}{4}-3x^2z^2+\frac{3y^4}{8}-3y^2z^2+z^4$
	$\mathbb{Q}_{4}^{(1,-1;a)}(A_1,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 \\ 0 & \frac{1}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{2}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{2}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{1}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{28} & 0 & 0 \end{bmatrix}$
296	symmetry	$\frac{\sqrt{70}yz\left(3x^2-y^2\right)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_4^{(1,-1;a)}(A_1,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{16} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{112} & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 \\ -\frac{\sqrt{42}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} \\ 0 & \frac{\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
297	symmetry	$\frac{\sqrt{70}xz\left(x^2-3y^2\right)}{4}$
	$\mathbb{Q}_4^{(1,-1;a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{16} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{16} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{112} & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 \\ -\frac{\sqrt{42}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} \\ 0 & \frac{\sqrt{70}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
298	symmetry	$-\frac{\sqrt{10}xz\left(3x^2+3y^2-4z^2\right)}{4}$
	$\mathbb{Q}_{4,1}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{10}}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{16} & 0 & \frac{\sqrt{6}}{16} & 0 & 0 \\ -\frac{\sqrt{2}}{112} & 0 & \frac{\sqrt{5}}{56} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{3}}{28} & 0 & \frac{\sqrt{15}}{14} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{112} & 0 & -\frac{\sqrt{15}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{7} & 0 & -\frac{\sqrt{5}}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}}{56} & 0 & \frac{\sqrt{30}}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{28} & 0 & -\frac{\sqrt{3}}{7} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{56} & 0 & -\frac{\sqrt{2}}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{14} & 0 & \frac{3\sqrt{3}}{28} & 0 \end{bmatrix}$
299	symmetry	$-\frac{\sqrt{10}yz\left(3x^2+3y^2-4z^2\right)}{4}$
	$\mathbb{Q}_{4,2}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 \\ -\frac{\sqrt{2}i}{112} & 0 & -\frac{\sqrt{5}i}{56} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{3}i}{28} & 0 & -\frac{\sqrt{15}i}{14} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{112} & 0 & \frac{\sqrt{15}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{7} & 0 & \frac{\sqrt{5}i}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}i}{56} & 0 & -\frac{\sqrt{30}i}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{28} & 0 & \frac{\sqrt{3}i}{7} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{56} & 0 & \frac{\sqrt{2}i}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{14} & 0 & -\frac{3\sqrt{3}i}{28} & 0 \end{bmatrix}$
300	symmetry	$-\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_{4,1}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
301	symmetry	$\frac{\sqrt{35}\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$
	$\mathbb{Q}_{4,2}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
302	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$
	$\mathbb{Q}_{4,1}^{(1,-1;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & 0 & -\frac{i}{8} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}i}{56} & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & -\frac{3\sqrt{30}i}{56} & 0 & 0 & 0 \\ -\frac{\sqrt{3}i}{56} & 0 & 0 & 0 & \frac{\sqrt{15}i}{56} & 0 & 0 & -\frac{11\sqrt{2}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{56} & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{56} & 0 & 0 & \frac{\sqrt{6}i}{56} & 0 & 0 & 0 & \frac{11\sqrt{2}i}{56} & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{30}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} \end{bmatrix}$
303	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$
	$\mathbb{Q}_{4,2}^{(1,-1;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 0 & 0 & 0 & \frac{1}{8} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{56} & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & \frac{3\sqrt{30}}{56} & 0 & 0 & 0 \\ -\frac{\sqrt{3}}{56} & 0 & 0 & 0 & -\frac{\sqrt{15}}{56} & 0 & 0 & -\frac{11\sqrt{2}}{56} & 0 & 0 & 0 & \frac{\sqrt{6}}{56} & 0 & 0 \\ 0 & \frac{\sqrt{15}}{56} & 0 & 0 & 0 & \frac{\sqrt{3}}{56} & 0 & 0 & \frac{\sqrt{6}}{56} & 0 & 0 & 0 & -\frac{11\sqrt{2}}{56} & 0 \\ 0 & 0 & -\frac{\sqrt{10}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{30}}{56} & 0 & 0 & 0 & \frac{\sqrt{42}}{56} \end{bmatrix}$
304	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_2^{(1,0;a)}(A_1)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{2}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{6}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{21} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{5}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{7} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{5}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{7} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{21} & 0 & 0 \end{bmatrix}$
305	symmetry	$\sqrt{3}xz$
	$\mathbb{Q}_{2,1}^{(1,0;a)}(E,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{3}}{9} & 0 & -\frac{\sqrt{6}}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{18} & 0 & -\frac{\sqrt{3}}{9} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{5\sqrt{10}}{84} & 0 & \frac{5}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{21} & 0 & \frac{\sqrt{3}}{21} & 0 & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{6}}{252} & 0 & \frac{25\sqrt{3}}{252} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{21} & 0 & \frac{1}{7} & 0 & 0 & 0 \\ 0 & 0 & \frac{25\sqrt{3}}{252} & 0 & \frac{5\sqrt{6}}{252} & 0 & 0 & 0 & 0 & -\frac{1}{7} & 0 & \frac{\sqrt{15}}{21} & 0 & 0 \\ 0 & 0 & 0 & \frac{5}{28} & 0 & -\frac{5\sqrt{10}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{21} & 0 & \frac{\sqrt{15}}{21} & 0 \end{bmatrix}$
306	symmetry	$\sqrt{3}yz$
	$\mathbb{Q}_{2,2}^{(1,0;a)}(E,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{3}i}{9} & 0 & \frac{\sqrt{6}i}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{18} & 0 & \frac{\sqrt{3}i}{9} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{5\sqrt{10}i}{84} & 0 & -\frac{5i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{21} & 0 & -\frac{\sqrt{3}i}{21} & 0 & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{6}i}{252} & 0 & -\frac{25\sqrt{3}i}{252} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{21} & 0 & -\frac{i}{7} & 0 & 0 & 0 \\ 0 & 0 & \frac{25\sqrt{3}i}{252} & 0 & -\frac{5\sqrt{6}i}{252} & 0 & 0 & 0 & 0 & -\frac{i}{7} & 0 & -\frac{\sqrt{15}i}{21} & 0 & 0 \\ 0 & 0 & 0 & \frac{5i}{28} & 0 & \frac{5\sqrt{10}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{21} & 0 & -\frac{\sqrt{15}i}{21} & 0 \end{bmatrix}$
307	symmetry	$\sqrt{3}xy$
	$\mathbb{Q}_{2,1}^{(1,0;a)}(E,2)$	$\begin{bmatrix} -\frac{\sqrt{15}i}{18} & 0 & 0 & 0 & \frac{\sqrt{3}i}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{18} & 0 & 0 & 0 & \frac{\sqrt{15}i}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{5i}{42} & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{42} & 0 & 0 & 0 \\ -\frac{5\sqrt{30}i}{126} & 0 & 0 & 0 & -\frac{5\sqrt{6}i}{63} & 0 & 0 & \frac{\sqrt{5}i}{14} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{42} & 0 & 0 \\ 0 & -\frac{5\sqrt{6}i}{63} & 0 & 0 & 0 & -\frac{5\sqrt{30}i}{126} & 0 & 0 & \frac{\sqrt{15}i}{42} & 0 & 0 & 0 & -\frac{\sqrt{5}i}{14} & 0 \\ 0 & 0 & -\frac{5i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{42} & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} \end{bmatrix}$
308	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_{2,2}^{(1,0;a)}(E,2)$	$\begin{bmatrix} -\frac{\sqrt{15}}{18} & 0 & 0 & 0 & -\frac{\sqrt{3}}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{18} & 0 & 0 & 0 & -\frac{\sqrt{15}}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5}{42} & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & \frac{\sqrt{3}}{42} & 0 & 0 & 0 \\ -\frac{5\sqrt{30}}{126} & 0 & 0 & 0 & \frac{5\sqrt{6}}{63} & 0 & 0 & \frac{\sqrt{5}}{14} & 0 & 0 & 0 & \frac{\sqrt{15}}{42} & 0 & 0 \\ 0 & -\frac{5\sqrt{6}}{63} & 0 & 0 & 0 & \frac{5\sqrt{30}}{126} & 0 & 0 & \frac{\sqrt{15}}{42} & 0 & 0 & 0 & \frac{\sqrt{5}}{14} & 0 \\ 0 & 0 & -\frac{5}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{42} & 0 & 0 & 0 & \frac{\sqrt{105}}{42} \end{bmatrix}$
309	symmetry	$\frac{3x^4}{8}+\frac{3x^2y^2}{4}-3x^2z^2+\frac{3y^4}{8}-3y^2z^2+z^4$
	$\mathbb{Q}_{4}^{(1,0;a)}(A_1,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{12} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{10}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{10}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & 0 \end{bmatrix}$
310	symmetry	$\frac{\sqrt{70}yz\left(3x^2-y^2\right)}{4}$
	$\mathbb{Q}_{4}^{(1,0;a)}(A_1,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{48} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{48} \\ 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}i}{112} & -\frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{210} & 0 \\ \frac{3\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{210} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{60} \\ 0 & -\frac{5\sqrt{42}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{140} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
311	symmetry	$\frac{\sqrt{70}xz\left(x^2-3y^2\right)}{4}$
	$\mathbb{Q}_{4}^{(1,0;a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{48} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{48} \\ 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{112} & -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{210} & 0 \\ \frac{3\sqrt{70}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{210} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{60} \\ 0 & -\frac{5\sqrt{42}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{140} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
312	symmetry	$-\frac{\sqrt{10}xz\left(3x^2+3y^2-4z^2\right)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_{4,1}^{(1,0;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{16} & 0 & -\frac{5\sqrt{6}}{48} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}}{48} & 0 & \frac{\sqrt{10}}{16} & 0 & 0 \\ \frac{\sqrt{30}}{112} & 0 & -\frac{5\sqrt{3}}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}}{140} & 0 & -\frac{1}{14} & 0 & 0 & 0 & 0 \\ 0 & -\frac{15\sqrt{2}}{112} & 0 & \frac{15}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{35} & 0 & \frac{\sqrt{3}}{84} & 0 & 0 & 0 \\ 0 & 0 & \frac{15}{56} & 0 & -\frac{15\sqrt{2}}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{84} & 0 & \frac{\sqrt{5}}{35} & 0 & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{3}}{56} & 0 & \frac{\sqrt{30}}{112} & 0 & 0 & 0 & 0 & \frac{1}{14} & 0 & -\frac{3\sqrt{5}}{140} & 0 \end{bmatrix}$
313	symmetry	$-\frac{\sqrt{10}yz\left(3x^2+3y^2-4z^2\right)}{4}$
	$\mathbb{Q}_{4,2}^{(1,0;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & \frac{5\sqrt{6}i}{48} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}i}{48} & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 \\ \frac{\sqrt{30}i}{112} & 0 & \frac{5\sqrt{3}i}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}i}{140} & 0 & \frac{i}{14} & 0 & 0 & 0 & 0 \\ 0 & -\frac{15\sqrt{2}i}{112} & 0 & -\frac{15i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{35} & 0 & -\frac{\sqrt{3}i}{84} & 0 & 0 & 0 \\ 0 & 0 & \frac{15i}{56} & 0 & \frac{15\sqrt{2}i}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{84} & 0 & -\frac{\sqrt{5}i}{35} & 0 & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{3}i}{56} & 0 & -\frac{\sqrt{30}i}{112} & 0 & 0 & 0 & 0 & \frac{i}{14} & 0 & \frac{3\sqrt{5}i}{140} & 0 \end{bmatrix}$
314	symmetry	$-\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
	$\mathbb{Q}_{4,1}^{(1,0;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{60} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{105}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
315	symmetry	$\frac{\sqrt{35}\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$
	$\mathbb{Q}_{4,2}^{(1,0;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{60} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{105}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{140} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
316	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_{4,1}^{(1,0;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{6}i}{56} & 0 & 0 & -\frac{\sqrt{70}i}{280} & 0 & 0 & 0 & \frac{3\sqrt{2}i}{56} & 0 & 0 & 0 \\ \frac{3\sqrt{5}i}{56} & 0 & 0 & 0 & -\frac{15i}{56} & 0 & 0 & \frac{11\sqrt{30}i}{840} & 0 & 0 & 0 & \frac{\sqrt{10}i}{280} & 0 & 0 \\ 0 & -\frac{15i}{56} & 0 & 0 & 0 & \frac{3\sqrt{5}i}{56} & 0 & 0 & -\frac{\sqrt{10}i}{280} & 0 & 0 & 0 & -\frac{11\sqrt{30}i}{840} & 0 \\ 0 & 0 & \frac{5\sqrt{6}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{56} & 0 & 0 & 0 & \frac{\sqrt{70}i}{280} \end{bmatrix}$
317	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$
	$\mathbb{Q}_{4,2}^{(1,0;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{6}}{56} & 0 & 0 & -\frac{\sqrt{70}}{280} & 0 & 0 & 0 & -\frac{3\sqrt{2}}{56} & 0 & 0 & 0 \\ \frac{3\sqrt{5}}{56} & 0 & 0 & 0 & \frac{15}{56} & 0 & 0 & \frac{11\sqrt{30}}{840} & 0 & 0 & 0 & -\frac{\sqrt{10}}{280} & 0 & 0 \\ 0 & -\frac{15}{56} & 0 & 0 & 0 & -\frac{3\sqrt{5}}{56} & 0 & 0 & -\frac{\sqrt{10}}{280} & 0 & 0 & 0 & \frac{11\sqrt{30}}{840} & 0 \\ 0 & 0 & \frac{5\sqrt{6}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{56} & 0 & 0 & 0 & -\frac{\sqrt{70}}{280} \end{bmatrix}$
318	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{Q}_2^{(1,1;a)}(A_1)$	$\begin{bmatrix} 0 & 0 & -\frac{1}{3} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{3} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{4\sqrt{3}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{2\sqrt{2}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{2\sqrt{2}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{4\sqrt{3}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{84} & 0 & 0 \end{bmatrix}$
319	symmetry	$\sqrt{3}xz$
	$\mathbb{Q}_{2,1}^{(1,1;a)}(E,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{6}}{9} & 0 & -\frac{\sqrt{3}}{9} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{9} & 0 & -\frac{\sqrt{6}}{9} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{2\sqrt{5}}{21} & 0 & -\frac{\sqrt{2}}{7} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{84} & 0 & \frac{\sqrt{6}}{84} & 0 & 0 & 0 & 0 \\ 0 & -\frac{2\sqrt{3}}{63} & 0 & -\frac{5\sqrt{6}}{63} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{84} & 0 & \frac{\sqrt{2}}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{6}}{63} & 0 & -\frac{2\sqrt{3}}{63} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{28} & 0 & \frac{\sqrt{30}}{84} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{7} & 0 & \frac{2\sqrt{5}}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{84} & 0 & \frac{\sqrt{30}}{84} & 0 \end{bmatrix}$
320	symmetry	$\sqrt{3}yz$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_{2,2}^{(1,1;a)}(E,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{6}i}{9} & 0 & \frac{\sqrt{3}i}{9} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{9} & 0 & \frac{\sqrt{6}i}{9} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{2\sqrt{5}i}{21} & 0 & \frac{\sqrt{2}i}{7} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{84} & 0 & -\frac{\sqrt{6}i}{84} & 0 & 0 & 0 & 0 \\ 0 & -\frac{2\sqrt{3}i}{63} & 0 & \frac{5\sqrt{6}i}{63} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{84} & 0 & -\frac{\sqrt{2}i}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{6}i}{63} & 0 & \frac{2\sqrt{3}i}{63} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{28} & 0 & -\frac{\sqrt{30}i}{84} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{7} & 0 & -\frac{2\sqrt{5}i}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{84} & 0 & -\frac{\sqrt{30}i}{84} & 0 \end{bmatrix}$
321	symmetry	$\sqrt{3}xy$
	$\mathbb{Q}_{2,1}^{(1,1;a)}(E,2)$	$\begin{bmatrix} -\frac{\sqrt{30}i}{18} & 0 & 0 & 0 & \frac{\sqrt{6}i}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{18} & 0 & 0 & 0 & \frac{\sqrt{30}i}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{2\sqrt{2}i}{21} & 0 & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{168} & 0 & 0 & 0 \\ \frac{4\sqrt{15}i}{63} & 0 & 0 & 0 & \frac{8\sqrt{3}i}{63} & 0 & 0 & \frac{\sqrt{10}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{168} & 0 & 0 \\ 0 & \frac{8\sqrt{3}i}{63} & 0 & 0 & 0 & \frac{4\sqrt{15}i}{63} & 0 & 0 & \frac{\sqrt{30}i}{168} & 0 & 0 & 0 & -\frac{\sqrt{10}i}{56} & 0 \\ 0 & 0 & \frac{2\sqrt{2}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{168} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{168} \end{bmatrix}$
322	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{Q}_{2,2}^{(1,1;a)}(E,2)$	$\begin{bmatrix} -\frac{\sqrt{30}}{18} & 0 & 0 & 0 & -\frac{\sqrt{6}}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{18} & 0 & 0 & 0 & -\frac{\sqrt{30}}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{2}}{21} & 0 & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & 0 & \frac{\sqrt{6}}{168} & 0 & 0 & 0 \\ \frac{4\sqrt{15}}{63} & 0 & 0 & 0 & -\frac{8\sqrt{3}}{63} & 0 & 0 & \frac{\sqrt{10}}{56} & 0 & 0 & 0 & \frac{\sqrt{30}}{168} & 0 & 0 \\ 0 & \frac{8\sqrt{3}}{63} & 0 & 0 & 0 & -\frac{4\sqrt{15}}{63} & 0 & 0 & \frac{\sqrt{30}}{168} & 0 & 0 & 0 & \frac{\sqrt{10}}{56} & 0 \\ 0 & 0 & \frac{2\sqrt{2}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{168} & 0 & 0 & 0 & \frac{\sqrt{210}}{168} \end{bmatrix}$
323	symmetry	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$
	$\mathbb{G}_3^{(a)}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{21} & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 \\ \frac{\sqrt{21}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}i}{168} & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 \\ \frac{5\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} \\ 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
324	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_3^{(a)}(A_2,1)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{21}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 \end{bmatrix}$
325	symmetry	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$
	$\mathbb{G}_3^{(a)}(A_2,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{21} & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 \\ -\frac{\sqrt{21}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{168} & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 \\ -\frac{5\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} \\ 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
326	symmetry	$\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{G}_{3,1}^{(a)}(E,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{7}}{21} & 0 & -\frac{\sqrt{14}}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{14}}{21} & 0 & \frac{\sqrt{7}}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 \\ \frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{14}}{24} & 0 & -\frac{\sqrt{7}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}}{84} & 0 & -\frac{\sqrt{14}}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & \frac{\sqrt{35}}{28} & 0 \end{bmatrix}$
327	symmetry	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{G}_{3,2}^{(a)}(E,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{7}i}{21} & 0 & \frac{\sqrt{14}i}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{14}i}{21} & 0 & -\frac{\sqrt{7}i}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 \\ \frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{14}i}{24} & 0 & \frac{\sqrt{7}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}i}{84} & 0 & \frac{\sqrt{14}i}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & -\frac{\sqrt{35}i}{28} & 0 \end{bmatrix}$
328	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_{3,1}^{(a)}(E,2)$	$\begin{bmatrix} -\frac{\sqrt{14}i}{42} & 0 & 0 & 0 & -\frac{\sqrt{70}i}{42} & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 \\ 0 & \frac{\sqrt{70}i}{42} & 0 & 0 & 0 & \frac{\sqrt{14}i}{42} & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 \\ -\frac{5\sqrt{7}i}{84} & 0 & 0 & 0 & \frac{\sqrt{35}i}{84} & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{56} & 0 & 0 \\ 0 & \frac{\sqrt{35}i}{84} & 0 & 0 & 0 & -\frac{5\sqrt{7}i}{84} & 0 & 0 & \frac{3\sqrt{14}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 \\ 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} \end{bmatrix}$
329	symmetry	$\sqrt{15}xyz$
	$\mathbb{G}_{3,2}^{(a)}(E,2)$	$\begin{bmatrix} -\frac{\sqrt{14}}{42} & 0 & 0 & 0 & \frac{\sqrt{70}}{42} & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 \\ 0 & \frac{\sqrt{70}}{42} & 0 & 0 & 0 & -\frac{\sqrt{14}}{42} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 \\ -\frac{5\sqrt{7}}{84} & 0 & 0 & 0 & -\frac{\sqrt{35}}{84} & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & \frac{3\sqrt{14}}{56} & 0 & 0 \\ 0 & \frac{\sqrt{35}}{84} & 0 & 0 & 0 & \frac{5\sqrt{7}}{84} & 0 & 0 & \frac{3\sqrt{14}}{56} & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 \\ 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} \end{bmatrix}$
330	symmetry	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$
	$\mathbb{G}_3^{(1,-1;a)}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{42} & \frac{\sqrt{210}i}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{42} & 0 \\ -\frac{\sqrt{5}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{42} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{42} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{42} & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{21} & 0 \\ -\frac{\sqrt{10}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{21} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} \\ 0 & -\frac{\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{42} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
331	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{G}_3^{(1,-1;a)}(A_2,1)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{5}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}i}{21} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}i}{21} & 0 & 0 & 0 \\ 0 & \frac{2\sqrt{15}i}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{2\sqrt{10}i}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{42} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{10}i}{105} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{42} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{2\sqrt{15}i}{105} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}i}{42} & 0 & 0 \end{bmatrix}$
332	symmetry	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_3^{(1,-1;a)}(A_2,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{42} & -\frac{\sqrt{210}}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{42} & 0 \\ \frac{\sqrt{5}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{42} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{42} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{42} & -\frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{21} & 0 \\ \frac{\sqrt{10}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{21} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} \\ 0 & \frac{\sqrt{6}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{42} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
333	symmetry	$\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{G}_{3,1}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{15}}{126} & 0 & \frac{\sqrt{30}}{126} & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}}{42} & 0 & \frac{\sqrt{10}}{14} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{126} & 0 & -\frac{\sqrt{15}}{126} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{14} & 0 & \frac{5\sqrt{6}}{42} & 0 & 0 \\ -\frac{\sqrt{2}}{42} & 0 & -\frac{\sqrt{5}}{35} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{3}}{42} & 0 & -\frac{\sqrt{15}}{21} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{90} & 0 & \frac{\sqrt{15}}{315} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{14} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}}{315} & 0 & \frac{\sqrt{30}}{90} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{35} & 0 & -\frac{\sqrt{2}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{21} & 0 & \frac{5\sqrt{3}}{42} & 0 \end{bmatrix}$
334	symmetry	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{G}_{3,2}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{15}i}{126} & 0 & -\frac{\sqrt{30}i}{126} & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}i}{42} & 0 & -\frac{\sqrt{10}i}{14} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{30}i}{126} & 0 & \frac{\sqrt{15}i}{126} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{14} & 0 & -\frac{5\sqrt{6}i}{42} & 0 & 0 \\ -\frac{\sqrt{2}i}{42} & 0 & \frac{\sqrt{5}i}{35} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{3}i}{42} & 0 & \frac{\sqrt{15}i}{21} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{90} & 0 & -\frac{\sqrt{15}i}{315} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{14} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}i}{315} & 0 & -\frac{\sqrt{30}i}{90} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{35} & 0 & \frac{\sqrt{2}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{21} & 0 & -\frac{5\sqrt{3}i}{42} & 0 \end{bmatrix}$
335	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{G}_{3,1}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} \frac{\sqrt{30}i}{252} & 0 & 0 & 0 & \frac{5\sqrt{6}i}{252} & 0 & 0 & \frac{\sqrt{5}i}{7} & 0 & 0 & 0 & \frac{\sqrt{15}i}{21} & 0 & 0 \\ 0 & -\frac{5\sqrt{6}i}{252} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{252} & 0 & 0 & \frac{\sqrt{15}i}{21} & 0 & 0 & 0 & \frac{\sqrt{5}i}{7} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{21} & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 & -\frac{5\sqrt{6}i}{84} & 0 & 0 & 0 \\ \frac{\sqrt{15}i}{63} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{63} & 0 & 0 & \frac{\sqrt{10}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{28} & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{63} & 0 & 0 & 0 & \frac{\sqrt{15}i}{63} & 0 & 0 & \frac{\sqrt{30}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{10}i}{28} & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}i}{84} & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} \end{bmatrix}$
336	symmetry	$\sqrt{15}xyz$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_{3,2}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} \frac{\sqrt{30}}{252} & 0 & 0 & 0 & -\frac{5\sqrt{6}}{252} & 0 & 0 & \frac{\sqrt{5}}{7} & 0 & 0 & 0 & -\frac{\sqrt{15}}{21} & 0 & 0 \\ 0 & -\frac{5\sqrt{6}}{252} & 0 & 0 & 0 & \frac{\sqrt{30}}{252} & 0 & 0 & \frac{\sqrt{15}}{21} & 0 & 0 & 0 & -\frac{\sqrt{5}}{7} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{21} & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & \frac{5\sqrt{6}}{84} & 0 & 0 & 0 \\ \frac{\sqrt{15}}{63} & 0 & 0 & 0 & \frac{\sqrt{3}}{63} & 0 & 0 & \frac{\sqrt{10}}{28} & 0 & 0 & 0 & \frac{\sqrt{30}}{28} & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{63} & 0 & 0 & 0 & -\frac{\sqrt{15}}{63} & 0 & 0 & \frac{\sqrt{30}}{28} & 0 & 0 & 0 & \frac{\sqrt{10}}{28} & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}}{84} & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} \end{bmatrix}$
337	symmetry	$-\frac{\sqrt{70}x\left(x^2-3y^2\right)\left(x^2+y^2-8z^2\right)}{16}$
	$\mathbb{G}_5^{(1,-1;a)}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{30} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{30} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{30} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{30} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{30} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
338	symmetry	$\frac{z\left(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4\right)}{8}$
	$\mathbb{G}_5^{(1,-1;a)}(A_2,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 \end{bmatrix}$
339	symmetry	$-\frac{\sqrt{70}y\left(3x^2-y^2\right)\left(x^2+y^2-8z^2\right)}{16}$
	$\mathbb{G}_5^{(1,-1;a)}(A_2,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{30} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{30} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{30} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{30} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{30} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
340	symmetry	$\frac{3\sqrt{14}y\left(5x^4-10x^2y^2+y^4\right)}{16}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_{5,1}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
341	symmetry	$\frac{3\sqrt{14}x\left(x^4-10x^2y^2+5y^4\right)}{16}$
	$\mathbb{G}_{5,2}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
342	symmetry	$-\frac{\sqrt{15}y\left(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4\right)}{8}$
	$\mathbb{G}_{5,1}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{30}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{30}}{60} & 0 \end{bmatrix}$
343	symmetry	$\frac{\sqrt{15}x\left(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4\right)}{8}$
	$\mathbb{G}_{5,2}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{30}i}{60} & 0 \end{bmatrix}$
344	symmetry	$-\frac{3\sqrt{35}z\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_{5,1}^{(1,-1;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
345	symmetry	$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$
	$\mathbb{G}_{5,2}^{(1,-1;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{20} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
346	symmetry	$\frac{\sqrt{105}z(x-y)(x+y)\left(x^2+y^2-2z^2\right)}{4}$
	$\mathbb{G}_{5,1}^{(1,-1;a)}(E,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{120} & 0 & 0 & 0 & \frac{\sqrt{42}i}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{40} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{40} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{40} & 0 & 0 & 0 & \frac{\sqrt{70}i}{40} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{24} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{120} \end{bmatrix}$
347	symmetry	$-\frac{\sqrt{105}xyz\left(x^2+y^2-2z^2\right)}{2}$
	$\mathbb{G}_{5,2}^{(1,-1;a)}(E,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{120} & 0 & 0 & 0 & -\frac{\sqrt{42}}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{40} & 0 & 0 & 0 & \frac{\sqrt{210}}{40} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{40} & 0 & 0 & 0 & -\frac{\sqrt{70}}{40} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{24} & 0 & 0 & 0 & \frac{\sqrt{30}}{120} \end{bmatrix}$
348	symmetry	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_3^{(1,0;a)}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{21} & \frac{5\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}i}{336} & 0 \\ \frac{\sqrt{7}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{336} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}i}{48} \\ 0 & 0 & 0 & 0 & -\frac{5\sqrt{210}i}{336} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{25\sqrt{14}i}{336} & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 \\ \frac{25\sqrt{14}i}{336} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} \\ 0 & \frac{5\sqrt{210}i}{336} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
349	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{G}_3^{(1,0;a)}(A_2,1)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{7}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{21}i}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{21}i}{84} & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{5\sqrt{14}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{14}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{5\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 \end{bmatrix}$
350	symmetry	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$
	$\mathbb{G}_3^{(1,0;a)}(A_2,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{21} & -\frac{5\sqrt{6}}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{336} & 0 \\ -\frac{\sqrt{7}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{336} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}}{48} \\ 0 & 0 & 0 & 0 & -\frac{5\sqrt{210}}{336} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{25\sqrt{14}}{336} & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 \\ -\frac{25\sqrt{14}}{336} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} \\ 0 & -\frac{5\sqrt{210}}{336} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
351	symmetry	$\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{G}_{3,1}^{(1,0;a)}(E,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{21}}{63} & 0 & -\frac{\sqrt{42}}{63} & 0 & 0 & 0 & 0 & \frac{5\sqrt{210}}{336} & 0 & \frac{5\sqrt{14}}{112} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}}{63} & 0 & \frac{\sqrt{21}}{63} & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}}{112} & 0 & \frac{5\sqrt{210}}{336} & 0 & 0 \\ \frac{5\sqrt{70}}{336} & 0 & \frac{5\sqrt{7}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{42}}{144} & 0 & -\frac{5\sqrt{21}}{504} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{21}}{504} & 0 & -\frac{5\sqrt{42}}{144} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{7}}{56} & 0 & \frac{5\sqrt{70}}{336} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & -\frac{\sqrt{105}}{84} & 0 \end{bmatrix}$
352	symmetry	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_{3,2}^{(1,0;a)}(E,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{21}i}{63} & 0 & \frac{\sqrt{42}i}{63} & 0 & 0 & 0 & 0 & \frac{5\sqrt{210}i}{336} & 0 & -\frac{5\sqrt{14}i}{112} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}i}{63} & 0 & -\frac{\sqrt{21}i}{63} & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}i}{112} & 0 & -\frac{5\sqrt{210}i}{336} & 0 & 0 \\ \frac{5\sqrt{70}i}{336} & 0 & -\frac{5\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{42}i}{144} & 0 & \frac{5\sqrt{21}i}{504} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{21}i}{504} & 0 & \frac{5\sqrt{42}i}{144} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{7}i}{56} & 0 & -\frac{5\sqrt{70}i}{336} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & \frac{\sqrt{105}i}{84} & 0 \end{bmatrix}$
353	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{G}_{3,1}^{(1,0;a)}(E,2)$	$\begin{bmatrix} -\frac{\sqrt{42}i}{126} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{126} & 0 & 0 & \frac{5\sqrt{7}i}{56} & 0 & 0 & 0 & \frac{5\sqrt{21}i}{168} & 0 & 0 \\ 0 & \frac{\sqrt{210}i}{126} & 0 & 0 & 0 & \frac{\sqrt{42}i}{126} & 0 & 0 & \frac{5\sqrt{21}i}{168} & 0 & 0 & 0 & \frac{5\sqrt{7}i}{56} & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{70}i}{168} & 0 & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & 0 \\ -\frac{25\sqrt{21}i}{504} & 0 & 0 & 0 & \frac{5\sqrt{105}i}{504} & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 \\ 0 & \frac{5\sqrt{105}i}{504} & 0 & 0 & 0 & -\frac{25\sqrt{21}i}{504} & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 \\ 0 & 0 & \frac{5\sqrt{70}i}{168} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} \end{bmatrix}$
354	symmetry	$\sqrt{15}xyz$
	$\mathbb{G}_{3,2}^{(1,0;a)}(E,2)$	$\begin{bmatrix} -\frac{\sqrt{42}}{126} & 0 & 0 & 0 & \frac{\sqrt{210}}{126} & 0 & 0 & \frac{5\sqrt{7}}{56} & 0 & 0 & 0 & -\frac{5\sqrt{21}}{168} & 0 & 0 \\ 0 & \frac{\sqrt{210}}{126} & 0 & 0 & 0 & -\frac{\sqrt{42}}{126} & 0 & 0 & \frac{5\sqrt{21}}{168} & 0 & 0 & 0 & -\frac{5\sqrt{7}}{56} & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{70}}{168} & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 \\ -\frac{25\sqrt{21}}{504} & 0 & 0 & 0 & -\frac{5\sqrt{105}}{504} & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 \\ 0 & \frac{5\sqrt{105}}{504} & 0 & 0 & 0 & \frac{25\sqrt{21}}{504} & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 \\ 0 & 0 & \frac{5\sqrt{70}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & \frac{\sqrt{6}}{24} \end{bmatrix}$
355	symmetry	z
	$\mathbb{G}_{1}^{(1,1;a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
356	symmetry	$-y$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_{1,1}^{(1,1;a)}(E)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
357	symmetry	x
	$\mathbb{G}_{1,2}^{(1,1;a)}(E)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
358	symmetry	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$
	$\mathbb{G}_3^{(1,1;a)}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{3i}{7} & \frac{\sqrt{42}i}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{112} & 0 \\ \frac{3i}{7} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{112} \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{30}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{15\sqrt{2}i}{112} & -\frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{42} & 0 \\ -\frac{15\sqrt{2}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} \\ 0 & -\frac{3\sqrt{30}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{84} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
359	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{G}_3^{(1,1;a)}(A_2,1)$	$\begin{bmatrix} 0 & 0 & \frac{3i}{7} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3i}{7} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{28} & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{3}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{3}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{84} & 0 & 0 \end{bmatrix}$
360	symmetry	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_3^{(1,1;a)}(A_2,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{3}{7} & -\frac{\sqrt{42}}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{112} & 0 \\ -\frac{3}{7} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{112} \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{30}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{15\sqrt{2}}{112} & \frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{42} & 0 \\ \frac{15\sqrt{2}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} \\ 0 & \frac{3\sqrt{30}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{84} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
361	symmetry	$\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{G}_{3,1}^{(1,1;a)}(E,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{3}}{7} & 0 & -\frac{\sqrt{6}}{7} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{112} & 0 & \frac{3\sqrt{2}}{112} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{7} & 0 & \frac{\sqrt{3}}{7} & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{112} & 0 & \frac{\sqrt{30}}{112} & 0 & 0 \\ -\frac{3\sqrt{10}}{112} & 0 & -\frac{9}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{84} & 0 & \frac{\sqrt{3}}{42} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{16} & 0 & \frac{\sqrt{3}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{56} & 0 & \frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & -\frac{1}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{9}{56} & 0 & -\frac{3\sqrt{10}}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{42} & 0 & -\frac{\sqrt{15}}{84} & 0 \end{bmatrix}$
362	symmetry	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{G}_{3,2}^{(1,1;a)}(E,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{3}i}{7} & 0 & \frac{\sqrt{6}i}{7} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{112} & 0 & -\frac{3\sqrt{2}i}{112} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{7} & 0 & -\frac{\sqrt{3}i}{7} & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{112} & 0 & -\frac{\sqrt{30}i}{112} & 0 & 0 \\ -\frac{3\sqrt{10}i}{112} & 0 & \frac{9i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{84} & 0 & -\frac{\sqrt{3}i}{42} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{16} & 0 & -\frac{\sqrt{3}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{56} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & -\frac{i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{9i}{56} & 0 & \frac{3\sqrt{10}i}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{42} & 0 & \frac{\sqrt{15}i}{84} & 0 \end{bmatrix}$
363	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{G}_{3,1}^{(1,1;a)}(E,2)$	$\begin{bmatrix} -\frac{\sqrt{6}i}{14} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{14} & 0 & 0 & \frac{3i}{56} & 0 & 0 & 0 & \frac{\sqrt{3}i}{56} & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{14} & 0 & 0 & 0 & \frac{\sqrt{6}i}{14} & 0 & 0 & \frac{\sqrt{3}i}{56} & 0 & 0 & 0 & \frac{3i}{56} & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{10}i}{56} & 0 & 0 & \frac{\sqrt{42}i}{168} & 0 & 0 & 0 & \frac{\sqrt{30}i}{168} & 0 & 0 & 0 \\ \frac{5\sqrt{3}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{56} & 0 & 0 & -\frac{\sqrt{2}i}{56} & 0 & 0 & 0 & \frac{\sqrt{6}i}{56} & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{56} & 0 & 0 & 0 & \frac{5\sqrt{3}i}{56} & 0 & 0 & -\frac{\sqrt{6}i}{56} & 0 & 0 & 0 & \frac{\sqrt{2}i}{56} & 0 \\ 0 & 0 & -\frac{3\sqrt{10}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{168} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{168} \end{bmatrix}$
364	symmetry	$\sqrt{15}xyz$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_{3,2}^{(1,1;a)}(E,2)$	$\begin{bmatrix} -\frac{\sqrt{6}}{14} & 0 & 0 & 0 & \frac{\sqrt{30}}{14} & 0 & 0 & \frac{3}{56} & 0 & 0 & 0 & -\frac{\sqrt{3}}{56} & 0 & 0 \\ 0 & \frac{\sqrt{30}}{14} & 0 & 0 & 0 & -\frac{\sqrt{6}}{14} & 0 & 0 & \frac{\sqrt{3}}{56} & 0 & 0 & 0 & -\frac{3}{56} & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{10}}{56} & 0 & 0 & \frac{\sqrt{42}}{168} & 0 & 0 & 0 & -\frac{\sqrt{30}}{168} & 0 & 0 & 0 \\ \frac{5\sqrt{3}}{56} & 0 & 0 & 0 & \frac{\sqrt{15}}{56} & 0 & 0 & -\frac{\sqrt{2}}{56} & 0 & 0 & 0 & -\frac{\sqrt{6}}{56} & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{56} & 0 & 0 & 0 & -\frac{5\sqrt{3}}{56} & 0 & 0 & -\frac{\sqrt{6}}{56} & 0 & 0 & 0 & -\frac{\sqrt{2}}{56} & 0 \\ 0 & 0 & -\frac{3\sqrt{10}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{168} & 0 & 0 & 0 & \frac{\sqrt{42}}{168} \end{bmatrix}$
365	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{T}_2^{(a)}(A_1)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{7} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{i}{7} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{14} & 0 & 0 \end{bmatrix}$
366	symmetry	$\sqrt{3}xz$
	$\mathbb{T}_{2,1}^{(a)}(E,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{2}i}{6} & 0 & \frac{i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{i}{6} & 0 & \frac{\sqrt{2}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{15}i}{42} & 0 & -\frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{14} & 0 & \frac{\sqrt{2}i}{14} & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{42} & 0 & -\frac{5\sqrt{2}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{14} & 0 & \frac{\sqrt{6}i}{14} & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{2}i}{84} & 0 & -\frac{i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{14} & 0 & \frac{\sqrt{10}i}{14} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{28} & 0 & \frac{\sqrt{15}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{14} & 0 & \frac{\sqrt{10}i}{14} & 0 \end{bmatrix}$
367	symmetry	$\sqrt{3}yz$
	$\mathbb{T}_{2,2}^{(a)}(E,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{2}}{6} & 0 & \frac{1}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{1}{6} & 0 & \frac{\sqrt{2}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}}{42} & 0 & -\frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{14} & 0 & \frac{\sqrt{2}}{14} & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{42} & 0 & -\frac{5\sqrt{2}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{14} & 0 & \frac{\sqrt{6}}{14} & 0 & 0 & 0 \\ 0 & 0 & \frac{5\sqrt{2}}{84} & 0 & -\frac{1}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{14} & 0 & \frac{\sqrt{10}}{14} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{28} & 0 & \frac{\sqrt{15}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{14} & 0 & \frac{\sqrt{10}}{14} & 0 \end{bmatrix}$
368	symmetry	$\sqrt{3}xy$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}^{(a)}_{2,1}(E,2)$	$\begin{bmatrix} -\frac{\sqrt{10}}{12} & 0 & 0 & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & 0 & \frac{\sqrt{10}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{42} & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & \frac{\sqrt{2}}{28} & 0 & 0 & 0 \\ -\frac{\sqrt{5}}{21} & 0 & 0 & 0 & -\frac{2}{21} & 0 & 0 & -\frac{\sqrt{30}}{28} & 0 & 0 & 0 & \frac{\sqrt{10}}{28} & 0 & 0 \\ 0 & -\frac{2}{21} & 0 & 0 & 0 & -\frac{\sqrt{5}}{21} & 0 & 0 & -\frac{\sqrt{10}}{28} & 0 & 0 & 0 & \frac{\sqrt{30}}{28} & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{28} & 0 & 0 & 0 & \frac{\sqrt{70}}{28} \end{bmatrix}$
369	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{T}^{(a)}_{2,2}(E,2)$	$\begin{bmatrix} \frac{\sqrt{10}i}{12} & 0 & 0 & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & 0 & \frac{\sqrt{10}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{42} & 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & \frac{\sqrt{2}i}{28} & 0 & 0 & 0 \\ \frac{\sqrt{5}i}{21} & 0 & 0 & 0 & -\frac{2i}{21} & 0 & 0 & \frac{\sqrt{30}i}{28} & 0 & 0 & 0 & \frac{\sqrt{10}i}{28} & 0 & 0 \\ 0 & \frac{2i}{21} & 0 & 0 & 0 & -\frac{\sqrt{5}i}{21} & 0 & 0 & \frac{\sqrt{10}i}{28} & 0 & 0 & 0 & \frac{\sqrt{30}i}{28} & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{28} & 0 & 0 & 0 & \frac{\sqrt{70}i}{28} \end{bmatrix}$
370	symmetry	$\frac{3x^4}{8}+\frac{3x^2y^2}{4}-3x^2z^2+\frac{3y^4}{8}-3y^2z^2+z^4$
	$\mathbb{T}^{(a)}_{4}(A_1,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{2}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}i}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{2}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}i}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{28} & 0 & 0 \end{bmatrix}$
371	symmetry	$\frac{\sqrt{70}yz\left(3x^2-y^2\right)}{4}$
	$\mathbb{T}^{(a)}_{4}(A_1,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{24} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{24} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{56} & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 \\ \frac{3\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} \\ 0 & -\frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
372	symmetry	$\frac{\sqrt{70}xz\left(x^2-3y^2\right)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_4^{(a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{24} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{24} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{56} & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 \\ -\frac{3\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} \\ 0 & \frac{\sqrt{210}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
373	symmetry	$-\frac{\sqrt{10}xz\left(3x^2+3y^2-4z^2\right)}{4}$
	$\mathbb{T}_{4,1}^{(a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 \\ -\frac{\sqrt{6}i}{56} & 0 & \frac{\sqrt{15}i}{28} & 0 & 0 & 0 & 0 & \frac{3i}{28} & 0 & -\frac{\sqrt{5}i}{14} & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{10}i}{56} & 0 & -\frac{3\sqrt{5}i}{28} & 0 & 0 & 0 & 0 & -\frac{i}{7} & 0 & \frac{\sqrt{15}i}{84} & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{5}i}{28} & 0 & \frac{3\sqrt{10}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{84} & 0 & \frac{i}{7} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}i}{28} & 0 & -\frac{\sqrt{6}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{14} & 0 & -\frac{3i}{28} & 0 \end{bmatrix}$
374	symmetry	$-\frac{\sqrt{10}yz\left(3x^2+3y^2-4z^2\right)}{4}$
	$\mathbb{T}_{4,2}^{(a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & \frac{\sqrt{2}}{8} & 0 & 0 \\ \frac{\sqrt{6}}{56} & 0 & \frac{\sqrt{15}}{28} & 0 & 0 & 0 & 0 & -\frac{3}{28} & 0 & -\frac{\sqrt{5}}{14} & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{10}}{56} & 0 & -\frac{3\sqrt{5}}{28} & 0 & 0 & 0 & 0 & \frac{1}{7} & 0 & \frac{\sqrt{15}}{84} & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{5}}{28} & 0 & \frac{3\sqrt{10}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{84} & 0 & \frac{1}{7} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{28} & 0 & -\frac{\sqrt{6}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{14} & 0 & -\frac{3}{28} & 0 \end{bmatrix}$
375	symmetry	$-\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
	$\mathbb{T}_{4,1}^{(a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
376	symmetry	$\frac{\sqrt{35}\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}^{(a)}_{4,2}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
377	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$
	$\mathbb{T}^{(a)}_{4,1}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}}{28} & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & -\frac{3\sqrt{10}}{56} & 0 & 0 & 0 \\ \frac{3}{28} & 0 & 0 & 0 & -\frac{3\sqrt{5}}{28} & 0 & 0 & -\frac{11\sqrt{6}}{168} & 0 & 0 & 0 & -\frac{\sqrt{2}}{56} & 0 & 0 \\ 0 & -\frac{3\sqrt{5}}{28} & 0 & 0 & 0 & \frac{3}{28} & 0 & 0 & \frac{\sqrt{2}}{56} & 0 & 0 & 0 & \frac{11\sqrt{6}}{168} & 0 \\ 0 & 0 & \frac{\sqrt{30}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{56} & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} \end{bmatrix}$
378	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$
	$\mathbb{T}^{(a)}_{4,2}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{28} & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{56} & 0 & 0 & 0 \\ -\frac{3i}{28} & 0 & 0 & 0 & -\frac{3\sqrt{5}i}{28} & 0 & 0 & \frac{11\sqrt{6}i}{168} & 0 & 0 & 0 & -\frac{\sqrt{2}i}{56} & 0 & 0 \\ 0 & \frac{3\sqrt{5}i}{28} & 0 & 0 & 0 & \frac{3i}{28} & 0 & 0 & -\frac{\sqrt{2}i}{56} & 0 & 0 & 0 & \frac{11\sqrt{6}i}{168} & 0 \\ 0 & 0 & -\frac{\sqrt{30}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} \end{bmatrix}$
379	symmetry	$\frac{3x^4}{8}+\frac{3x^2y^2}{4}-3x^2z^2+\frac{3y^4}{8}-3y^2z^2+z^4$
	$\mathbb{T}^{(1,-1;a)}_{4}(A_1,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 \\ 0 & \frac{i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{2}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{2}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}i}{28} & 0 & 0 \end{bmatrix}$
380	symmetry	$\frac{\sqrt{70}yz\left(3x^2-y^2\right)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_4^{(1,-1;a)}(A_1,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{16} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{16} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{112} & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 \\ \frac{\sqrt{42}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} \\ 0 & -\frac{\sqrt{70}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
381	symmetry	$\frac{\sqrt{70}xz\left(x^2-3y^2\right)}{4}$
	$\mathbb{T}_4^{(1,-1;a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{16} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{16} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{112} & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 \\ -\frac{\sqrt{42}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} \\ 0 & \frac{\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
382	symmetry	$-\frac{\sqrt{10}xz\left(3x^2+3y^2-4z^2\right)}{4}$
	$\mathbb{T}_{4,1}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 \\ -\frac{\sqrt{2}i}{112} & 0 & \frac{\sqrt{5}i}{56} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{3}i}{28} & 0 & \frac{\sqrt{15}i}{14} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{112} & 0 & -\frac{\sqrt{15}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{7} & 0 & -\frac{\sqrt{5}i}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}i}{56} & 0 & \frac{\sqrt{30}i}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{28} & 0 & -\frac{\sqrt{3}i}{7} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{56} & 0 & -\frac{\sqrt{2}i}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{14} & 0 & \frac{3\sqrt{3}i}{28} & 0 \end{bmatrix}$
383	symmetry	$-\frac{\sqrt{10}yz\left(3x^2+3y^2-4z^2\right)}{4}$
	$\mathbb{T}_{4,2}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{10}}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{16} & 0 & \frac{\sqrt{6}}{16} & 0 & 0 \\ \frac{\sqrt{2}}{112} & 0 & \frac{\sqrt{5}}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{3}}{28} & 0 & \frac{\sqrt{15}}{14} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{112} & 0 & -\frac{\sqrt{15}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{7} & 0 & -\frac{\sqrt{5}}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}}{56} & 0 & \frac{\sqrt{30}}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{28} & 0 & -\frac{\sqrt{3}}{7} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{56} & 0 & -\frac{\sqrt{2}}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{14} & 0 & \frac{3\sqrt{3}}{28} & 0 \end{bmatrix}$
384	symmetry	$-\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_{4,1}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
385	symmetry	$\frac{\sqrt{35}\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$
	$\mathbb{T}_{4,2}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
386	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$
	$\mathbb{T}_{4,1}^{(1,-1;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{8} & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & \frac{1}{8} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{56} & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & \frac{3\sqrt{30}}{56} & 0 & 0 & 0 \\ \frac{\sqrt{3}}{56} & 0 & 0 & 0 & -\frac{\sqrt{15}}{56} & 0 & 0 & \frac{11\sqrt{2}}{56} & 0 & 0 & 0 & \frac{\sqrt{6}}{56} & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{56} & 0 & 0 & 0 & \frac{\sqrt{3}}{56} & 0 & 0 & -\frac{\sqrt{6}}{56} & 0 & 0 & 0 & -\frac{11\sqrt{2}}{56} & 0 \\ 0 & 0 & \frac{\sqrt{10}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{30}}{56} & 0 & 0 & 0 & \frac{\sqrt{42}}{56} \end{bmatrix}$
387	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$
	$\mathbb{T}_{4,2}^{(1,-1;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & 0 & \frac{i}{8} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{56} & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & \frac{3\sqrt{30}i}{56} & 0 & 0 & 0 \\ -\frac{\sqrt{3}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{56} & 0 & 0 & -\frac{11\sqrt{2}i}{56} & 0 & 0 & 0 & \frac{\sqrt{6}i}{56} & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{56} & 0 & 0 & 0 & \frac{\sqrt{3}i}{56} & 0 & 0 & \frac{\sqrt{6}i}{56} & 0 & 0 & 0 & -\frac{11\sqrt{2}i}{56} & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{30}i}{56} & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} \end{bmatrix}$
388	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_2^{(1,0;a)}(A_1)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{2}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{21} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{5i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{7} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{7} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{5\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{21} & 0 & 0 \end{bmatrix}$
389	symmetry	$\sqrt{3}xz$
	$\mathbb{T}_{2,1}^{(1,0;a)}(E,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{3}i}{9} & 0 & \frac{\sqrt{6}i}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{18} & 0 & \frac{\sqrt{3}i}{9} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{5\sqrt{10}i}{84} & 0 & -\frac{5i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{21} & 0 & -\frac{\sqrt{3}i}{21} & 0 & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{6}i}{252} & 0 & -\frac{25\sqrt{3}i}{252} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{21} & 0 & -\frac{i}{7} & 0 & 0 & 0 \\ 0 & 0 & -\frac{25\sqrt{3}i}{252} & 0 & -\frac{5\sqrt{6}i}{252} & 0 & 0 & 0 & 0 & \frac{i}{7} & 0 & -\frac{\sqrt{15}i}{21} & 0 & 0 \\ 0 & 0 & 0 & -\frac{5i}{28} & 0 & \frac{5\sqrt{10}i}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{21} & 0 & -\frac{\sqrt{15}i}{21} & 0 \end{bmatrix}$
390	symmetry	$\sqrt{3}yz$
	$\mathbb{T}_{2,2}^{(1,0;a)}(E,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{3}}{9} & 0 & \frac{\sqrt{6}}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{18} & 0 & \frac{\sqrt{3}}{9} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{5\sqrt{10}}{84} & 0 & -\frac{5}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{21} & 0 & -\frac{\sqrt{3}}{21} & 0 & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{6}}{252} & 0 & -\frac{25\sqrt{3}}{252} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{21} & 0 & -\frac{1}{7} & 0 & 0 & 0 \\ 0 & 0 & \frac{25\sqrt{3}}{252} & 0 & -\frac{5\sqrt{6}}{252} & 0 & 0 & 0 & 0 & -\frac{1}{7} & 0 & -\frac{\sqrt{15}}{21} & 0 & 0 \\ 0 & 0 & 0 & \frac{5}{28} & 0 & \frac{5\sqrt{10}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{21} & 0 & -\frac{\sqrt{15}}{21} & 0 \end{bmatrix}$
391	symmetry	$\sqrt{3}xy$
	$\mathbb{T}_{2,1}^{(1,0;a)}(E,2)$	$\begin{bmatrix} -\frac{\sqrt{15}}{18} & 0 & 0 & 0 & \frac{\sqrt{3}}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{18} & 0 & 0 & 0 & \frac{\sqrt{15}}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{5}{42} & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & -\frac{\sqrt{3}}{42} & 0 & 0 & 0 \\ -\frac{5\sqrt{30}}{126} & 0 & 0 & 0 & -\frac{5\sqrt{6}}{63} & 0 & 0 & \frac{\sqrt{5}}{14} & 0 & 0 & 0 & -\frac{\sqrt{15}}{42} & 0 & 0 \\ 0 & -\frac{5\sqrt{6}}{63} & 0 & 0 & 0 & -\frac{5\sqrt{30}}{126} & 0 & 0 & \frac{\sqrt{15}}{42} & 0 & 0 & 0 & -\frac{\sqrt{5}}{14} & 0 \\ 0 & 0 & -\frac{5}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{42} & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} \end{bmatrix}$
392	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_{2,2}^{(1,0;a)}(E,2)$	$\begin{bmatrix} \frac{\sqrt{15}i}{18} & 0 & 0 & 0 & \frac{\sqrt{3}i}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{18} & 0 & 0 & 0 & \frac{\sqrt{15}i}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{5i}{42} & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{42} & 0 & 0 & 0 \\ \frac{5\sqrt{30}i}{126} & 0 & 0 & 0 & -\frac{5\sqrt{6}i}{63} & 0 & 0 & -\frac{\sqrt{5}i}{14} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{42} & 0 & 0 \\ 0 & \frac{5\sqrt{6}i}{63} & 0 & 0 & 0 & -\frac{5\sqrt{30}i}{126} & 0 & 0 & -\frac{\sqrt{15}i}{42} & 0 & 0 & 0 & -\frac{\sqrt{5}i}{14} & 0 \\ 0 & 0 & \frac{5i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{42} & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} \end{bmatrix}$
393	symmetry	$\frac{3x^4}{8}+\frac{3x^2y^2}{4}-3x^2z^2+\frac{3y^4}{8}-3y^2z^2+z^4$
	$\mathbb{T}_{4}^{(1,0;a)}(A_1,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{12} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{10}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{10}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{28} & 0 & 0 \end{bmatrix}$
394	symmetry	$\frac{\sqrt{70}yz\left(3x^2-y^2\right)}{4}$
	$\mathbb{T}_{4}^{(1,0;a)}(A_1,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{48} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{48} \\ 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}}{112} & -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{210} & 0 \\ \frac{3\sqrt{70}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{210} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{60} \\ 0 & -\frac{5\sqrt{42}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{140} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
395	symmetry	$\frac{\sqrt{70}xz\left(x^2-3y^2\right)}{4}$
	$\mathbb{T}_{4}^{(1,0;a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{48} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{48} \\ 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}i}{112} & \frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{210} & 0 \\ -\frac{3\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{210} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{60} \\ 0 & \frac{5\sqrt{42}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{140} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
396	symmetry	$-\frac{\sqrt{10}xz\left(3x^2+3y^2-4z^2\right)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_{4,1}^{(1,0;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 & \frac{5\sqrt{6}i}{48} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}i}{48} & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 \\ -\frac{\sqrt{30}i}{112} & 0 & \frac{5\sqrt{3}i}{56} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}i}{140} & 0 & \frac{i}{14} & 0 & 0 & 0 & 0 \\ 0 & \frac{15\sqrt{2}i}{112} & 0 & -\frac{15i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{35} & 0 & -\frac{\sqrt{3}i}{84} & 0 & 0 & 0 \\ 0 & 0 & -\frac{15i}{56} & 0 & \frac{15\sqrt{2}i}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{84} & 0 & -\frac{\sqrt{5}i}{35} & 0 & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{3}i}{56} & 0 & -\frac{\sqrt{30}i}{112} & 0 & 0 & 0 & 0 & -\frac{i}{14} & 0 & \frac{3\sqrt{5}i}{140} & 0 \end{bmatrix}$
397	symmetry	$-\frac{\sqrt{10}yz\left(3x^2+3y^2-4z^2\right)}{4}$
	$\mathbb{T}_{4,2}^{(1,0;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{16} & 0 & \frac{5\sqrt{6}}{48} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}}{48} & 0 & -\frac{\sqrt{10}}{16} & 0 & 0 \\ \frac{\sqrt{30}}{112} & 0 & \frac{5\sqrt{3}}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}}{140} & 0 & \frac{1}{14} & 0 & 0 & 0 & 0 \\ 0 & -\frac{15\sqrt{2}}{112} & 0 & -\frac{15}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{35} & 0 & -\frac{\sqrt{3}}{84} & 0 & 0 & 0 \\ 0 & 0 & \frac{15}{56} & 0 & \frac{15\sqrt{2}}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{84} & 0 & -\frac{\sqrt{5}}{35} & 0 & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{3}}{56} & 0 & -\frac{\sqrt{30}}{112} & 0 & 0 & 0 & 0 & \frac{1}{14} & 0 & \frac{3\sqrt{5}}{140} & 0 \end{bmatrix}$
398	symmetry	$-\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
	$\mathbb{T}_{4,1}^{(1,0;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{60} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{105}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{140} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
399	symmetry	$\frac{\sqrt{35}\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$
	$\mathbb{T}_{4,2}^{(1,0;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{105}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
400	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_{4,1}^{(1,0;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{6}}{56} & 0 & 0 & -\frac{\sqrt{70}}{280} & 0 & 0 & 0 & \frac{3\sqrt{2}}{56} & 0 & 0 & 0 \\ \frac{3\sqrt{5}}{56} & 0 & 0 & 0 & -\frac{15}{56} & 0 & 0 & \frac{11\sqrt{30}}{840} & 0 & 0 & 0 & \frac{\sqrt{10}}{280} & 0 & 0 \\ 0 & -\frac{15}{56} & 0 & 0 & 0 & \frac{3\sqrt{5}}{56} & 0 & 0 & -\frac{\sqrt{10}}{280} & 0 & 0 & 0 & -\frac{11\sqrt{30}}{840} & 0 \\ 0 & 0 & \frac{5\sqrt{6}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{56} & 0 & 0 & 0 & \frac{\sqrt{70}}{280} \end{bmatrix}$
401	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$
	$\mathbb{T}_{4,2}^{(1,0;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{6}i}{56} & 0 & 0 & \frac{\sqrt{70}i}{280} & 0 & 0 & 0 & \frac{3\sqrt{2}i}{56} & 0 & 0 & 0 \\ -\frac{3\sqrt{5}i}{56} & 0 & 0 & 0 & -\frac{15i}{56} & 0 & 0 & -\frac{11\sqrt{30}i}{840} & 0 & 0 & 0 & \frac{\sqrt{10}i}{280} & 0 & 0 \\ 0 & \frac{15i}{56} & 0 & 0 & 0 & \frac{3\sqrt{5}i}{56} & 0 & 0 & \frac{\sqrt{10}i}{280} & 0 & 0 & 0 & -\frac{11\sqrt{30}i}{840} & 0 \\ 0 & 0 & -\frac{5\sqrt{6}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{56} & 0 & 0 & 0 & \frac{\sqrt{70}i}{280} \end{bmatrix}$
402	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{T}_{2}^{(1,1;a)}(A_1)$	$\begin{bmatrix} 0 & 0 & -\frac{i}{3} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{i}{3} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{4\sqrt{3}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{2\sqrt{2}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{2\sqrt{2}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{4\sqrt{3}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{84} & 0 & 0 \end{bmatrix}$
403	symmetry	$\sqrt{3}xz$
	$\mathbb{T}_{2,1}^{(1,1;a)}(E,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{6}i}{9} & 0 & -\frac{\sqrt{3}i}{9} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{9} & 0 & -\frac{\sqrt{6}i}{9} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{2\sqrt{5}i}{21} & 0 & -\frac{\sqrt{2}i}{7} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{84} & 0 & \frac{\sqrt{6}i}{84} & 0 & 0 & 0 & 0 \\ 0 & -\frac{2\sqrt{3}i}{63} & 0 & -\frac{5\sqrt{6}i}{63} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{84} & 0 & \frac{\sqrt{2}i}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{6}i}{63} & 0 & -\frac{2\sqrt{3}i}{63} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{28} & 0 & \frac{\sqrt{30}i}{84} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{7} & 0 & \frac{2\sqrt{5}i}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{84} & 0 & \frac{\sqrt{30}i}{84} & 0 \end{bmatrix}$
404	symmetry	$\sqrt{3}yz$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}^{(1,1;a)}_{2,2}(E,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{6}}{9} & 0 & -\frac{\sqrt{3}}{9} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{9} & 0 & -\frac{\sqrt{6}}{9} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{2\sqrt{5}}{21} & 0 & -\frac{\sqrt{2}}{7} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{84} & 0 & \frac{\sqrt{6}}{84} & 0 & 0 & 0 & 0 \\ 0 & \frac{2\sqrt{3}}{63} & 0 & -\frac{5\sqrt{6}}{63} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{84} & 0 & \frac{\sqrt{2}}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{5\sqrt{6}}{63} & 0 & -\frac{2\sqrt{3}}{63} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{28} & 0 & \frac{\sqrt{30}}{84} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{7} & 0 & \frac{2\sqrt{5}}{21} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{84} & 0 & \frac{\sqrt{30}}{84} & 0 \end{bmatrix}$
405	symmetry	$\sqrt{3}xy$
	$\mathbb{T}^{(1,1;a)}_{2,1}(E,2)$	$\begin{bmatrix} \frac{\sqrt{30}}{18} & 0 & 0 & 0 & -\frac{\sqrt{6}}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{18} & 0 & 0 & 0 & -\frac{\sqrt{30}}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{2}}{21} & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & \frac{\sqrt{6}}{168} & 0 & 0 & 0 \\ -\frac{4\sqrt{15}}{63} & 0 & 0 & 0 & -\frac{8\sqrt{3}}{63} & 0 & 0 & -\frac{\sqrt{10}}{56} & 0 & 0 & 0 & \frac{\sqrt{30}}{168} & 0 & 0 \\ 0 & -\frac{8\sqrt{3}}{63} & 0 & 0 & 0 & -\frac{4\sqrt{15}}{63} & 0 & 0 & -\frac{\sqrt{30}}{168} & 0 & 0 & 0 & \frac{\sqrt{10}}{56} & 0 \\ 0 & 0 & -\frac{2\sqrt{2}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{168} & 0 & 0 & 0 & \frac{\sqrt{210}}{168} \end{bmatrix}$
406	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{T}^{(1,1;a)}_{2,2}(E,2)$	$\begin{bmatrix} -\frac{\sqrt{30}i}{18} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{18} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{2}i}{21} & 0 & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & 0 & \frac{\sqrt{6}i}{168} & 0 & 0 & 0 \\ \frac{4\sqrt{15}i}{63} & 0 & 0 & 0 & -\frac{8\sqrt{3}i}{63} & 0 & 0 & \frac{\sqrt{10}i}{56} & 0 & 0 & 0 & \frac{\sqrt{30}i}{168} & 0 & 0 \\ 0 & \frac{8\sqrt{3}i}{63} & 0 & 0 & 0 & -\frac{4\sqrt{15}i}{63} & 0 & 0 & \frac{\sqrt{30}i}{168} & 0 & 0 & 0 & \frac{\sqrt{10}i}{56} & 0 \\ 0 & 0 & \frac{2\sqrt{2}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{168} & 0 & 0 & 0 & \frac{\sqrt{210}i}{168} \end{bmatrix}$
407	symmetry	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$
	$\mathbb{M}^{(a)}_{3}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{21} & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 \\ \frac{\sqrt{21}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{168} & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 \\ \frac{5\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} \\ 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
408	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_3^{(a)}(A_2,1)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{21}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 \end{bmatrix}$
409	symmetry	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$
	$\mathbb{M}_3^{(a)}(A_2,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{21} & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 \\ \frac{\sqrt{21}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{168} & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 \\ \frac{5\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} \\ 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
410	symmetry	$\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{M}_{3,1}^{(a)}(E,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{7}i}{21} & 0 & \frac{\sqrt{14}i}{21} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{14}i}{21} & 0 & -\frac{\sqrt{7}i}{21} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 \\ -\frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{14}i}{24} & 0 & \frac{\sqrt{7}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{7}i}{84} & 0 & \frac{\sqrt{14}i}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & -\frac{\sqrt{35}i}{28} & 0 \end{bmatrix}$
411	symmetry	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{M}_{3,2}^{(a)}(E,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{7}}{21} & 0 & \frac{\sqrt{14}}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{14}}{21} & 0 & -\frac{\sqrt{7}}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 \\ \frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{14}}{24} & 0 & \frac{\sqrt{7}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}}{84} & 0 & \frac{\sqrt{14}}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{35}}{28} & 0 \end{bmatrix}$
412	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_{3,1}^{(a)}(E,2)$	$\begin{bmatrix} -\frac{\sqrt{14}}{42} & 0 & 0 & 0 & -\frac{\sqrt{70}}{42} & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 \\ 0 & \frac{\sqrt{70}}{42} & 0 & 0 & 0 & \frac{\sqrt{14}}{42} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 \\ -\frac{5\sqrt{7}}{84} & 0 & 0 & 0 & \frac{\sqrt{35}}{84} & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & -\frac{3\sqrt{14}}{56} & 0 & 0 \\ 0 & \frac{\sqrt{35}}{84} & 0 & 0 & 0 & -\frac{5\sqrt{7}}{84} & 0 & 0 & \frac{3\sqrt{14}}{56} & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 \\ 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & \frac{\sqrt{2}}{8} \end{bmatrix}$
413	symmetry	$\sqrt{15}xyz$
	$\mathbb{M}_{3,2}^{(a)}(E,2)$	$\begin{bmatrix} \frac{\sqrt{14}i}{42} & 0 & 0 & 0 & -\frac{\sqrt{70}i}{42} & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 \\ 0 & -\frac{\sqrt{70}i}{42} & 0 & 0 & 0 & \frac{\sqrt{14}i}{42} & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 \\ \frac{5\sqrt{7}i}{84} & 0 & 0 & 0 & \frac{\sqrt{35}i}{84} & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{56} & 0 & 0 \\ 0 & -\frac{\sqrt{35}i}{84} & 0 & 0 & 0 & -\frac{5\sqrt{7}i}{84} & 0 & 0 & -\frac{3\sqrt{14}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 \\ 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} \end{bmatrix}$
414	symmetry	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$
	$\mathbb{M}_{3}^{(1,-1;a)}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{42} & \frac{\sqrt{210}}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{42} & 0 \\ -\frac{\sqrt{5}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{42} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{42} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{42} & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{21} & 0 \\ -\frac{\sqrt{10}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{21} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} \\ 0 & -\frac{\sqrt{6}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{42} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
415	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{M}_{3}^{(1,-1;a)}(A_2,1)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{5}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}}{21} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}}{21} & 0 & 0 & 0 \\ 0 & \frac{2\sqrt{15}}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}}{42} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{2\sqrt{10}}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{42} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{10}}{105} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{42} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{2\sqrt{15}}{105} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}}{42} & 0 & 0 \end{bmatrix}$
416	symmetry	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_3^{(1,-1;a)}(A_2,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{42} & \frac{\sqrt{210}i}{42} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{42} & 0 \\ -\frac{\sqrt{5}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{42} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{42} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{42} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{42} & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{21} & 0 \\ -\frac{\sqrt{10}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{21} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} \\ 0 & -\frac{\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{42} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
417	symmetry	$\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{M}_{3,1}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{15}i}{126} & 0 & -\frac{\sqrt{30}i}{126} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}i}{42} & 0 & -\frac{\sqrt{10}i}{14} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}i}{126} & 0 & \frac{\sqrt{15}i}{126} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{14} & 0 & -\frac{5\sqrt{6}i}{42} & 0 & 0 \\ \frac{\sqrt{2}i}{42} & 0 & \frac{\sqrt{5}i}{35} & 0 & 0 & 0 & 0 & \frac{5\sqrt{3}i}{42} & 0 & \frac{\sqrt{15}i}{21} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{90} & 0 & -\frac{\sqrt{15}i}{315} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{14} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}i}{315} & 0 & -\frac{\sqrt{30}i}{90} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{35} & 0 & \frac{\sqrt{2}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{21} & 0 & -\frac{5\sqrt{3}i}{42} & 0 \end{bmatrix}$
418	symmetry	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{M}_{3,2}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{15}}{126} & 0 & -\frac{\sqrt{30}}{126} & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}}{42} & 0 & -\frac{\sqrt{10}}{14} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{126} & 0 & \frac{\sqrt{15}}{126} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{14} & 0 & -\frac{5\sqrt{6}}{42} & 0 & 0 \\ -\frac{\sqrt{2}}{42} & 0 & \frac{\sqrt{5}}{35} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{3}}{42} & 0 & \frac{\sqrt{15}}{21} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{90} & 0 & -\frac{\sqrt{15}}{315} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{14} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}}{315} & 0 & -\frac{\sqrt{30}}{90} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{35} & 0 & \frac{\sqrt{2}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{21} & 0 & -\frac{5\sqrt{3}}{42} & 0 \end{bmatrix}$
419	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} \frac{\sqrt{30}}{252} & 0 & 0 & 0 & \frac{5\sqrt{6}}{252} & 0 & 0 & \frac{\sqrt{5}}{7} & 0 & 0 & 0 & \frac{\sqrt{15}}{21} & 0 & 0 \\ 0 & -\frac{5\sqrt{6}}{252} & 0 & 0 & 0 & -\frac{\sqrt{30}}{252} & 0 & 0 & \frac{\sqrt{15}}{21} & 0 & 0 & 0 & \frac{\sqrt{5}}{7} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{21} & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & -\frac{5\sqrt{6}}{84} & 0 & 0 & 0 \\ \frac{\sqrt{15}}{63} & 0 & 0 & 0 & -\frac{\sqrt{3}}{63} & 0 & 0 & \frac{\sqrt{10}}{28} & 0 & 0 & 0 & -\frac{\sqrt{30}}{28} & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{63} & 0 & 0 & 0 & \frac{\sqrt{15}}{63} & 0 & 0 & \frac{\sqrt{30}}{28} & 0 & 0 & 0 & -\frac{\sqrt{10}}{28} & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}}{84} & 0 & 0 & 0 & \frac{\sqrt{210}}{84} \end{bmatrix}$
420	symmetry	$\sqrt{15}xyz$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} -\frac{\sqrt{30}i}{252} & 0 & 0 & 0 & \frac{5\sqrt{6}i}{252} & 0 & 0 & -\frac{\sqrt{5}i}{7} & 0 & 0 & 0 & \frac{\sqrt{15}i}{21} & 0 & 0 \\ 0 & \frac{5\sqrt{6}i}{252} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{252} & 0 & 0 & -\frac{\sqrt{15}i}{21} & 0 & 0 & 0 & \frac{\sqrt{5}i}{7} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{21} & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & -\frac{5\sqrt{6}i}{84} & 0 & 0 & 0 \\ -\frac{\sqrt{15}i}{63} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{63} & 0 & 0 & -\frac{\sqrt{10}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{28} & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{63} & 0 & 0 & 0 & \frac{\sqrt{15}i}{63} & 0 & 0 & -\frac{\sqrt{30}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{10}i}{28} & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}i}{84} & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} \end{bmatrix}$
421	symmetry	$-\frac{\sqrt{70}x\left(x^2-3y^2\right)\left(x^2+y^2-8z^2\right)}{16}$
	$\mathbb{M}_{5}^{(1,-1;a)}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{30} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{30} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{30} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{30} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{30} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
422	symmetry	$\frac{z\left(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4\right)}{8}$
	$\mathbb{M}_{5}^{(1,-1;a)}(A_2,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 \end{bmatrix}$
423	symmetry	$-\frac{\sqrt{70}y\left(3x^2-y^2\right)\left(x^2+y^2-8z^2\right)}{16}$
	$\mathbb{M}_{5}^{(1,-1;a)}(A_2,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{30} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{30} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{30} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{30} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{30} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
424	symmetry	$\frac{3\sqrt{14}y\left(5x^4-10x^2y^2+y^4\right)}{16}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_{5,1}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
425	symmetry	$\frac{3\sqrt{14}x\left(x^4-10x^2y^2+5y^4\right)}{16}$
	$\mathbb{M}_{5,2}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
426	symmetry	$-\frac{\sqrt{15}y\left(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4\right)}{8}$
	$\mathbb{M}_{5,1}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{60} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{30}i}{60} & 0 \end{bmatrix}$
427	symmetry	$\frac{\sqrt{15}x\left(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4\right)}{8}$
	$\mathbb{M}_{5,2}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{30}}{60} & 0 \end{bmatrix}$
428	symmetry	$-\frac{3\sqrt{35}z\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_{5,1}^{(1,-1;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{20} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
429	symmetry	$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$
	$\mathbb{M}_{5,2}^{(1,-1;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
430	symmetry	$\frac{\sqrt{105}z(x-y)(x+y)\left(x^2+y^2-2z^2\right)}{4}$
	$\mathbb{M}_{5,1}^{(1,-1;a)}(E,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{120} & 0 & 0 & 0 & \frac{\sqrt{42}}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{40} & 0 & 0 & 0 & -\frac{\sqrt{210}}{40} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{40} & 0 & 0 & 0 & \frac{\sqrt{70}}{40} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{24} & 0 & 0 & 0 & -\frac{\sqrt{30}}{120} \end{bmatrix}$
431	symmetry	$-\frac{\sqrt{105}xyz\left(x^2+y^2-2z^2\right)}{2}$
	$\mathbb{M}_{5,2}^{(1,-1;a)}(E,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{120} & 0 & 0 & 0 & \frac{\sqrt{42}i}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{40} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{40} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{40} & 0 & 0 & 0 & \frac{\sqrt{70}i}{40} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{24} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{120} \end{bmatrix}$
432	symmetry	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_3^{(1,0;a)}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{21} & -\frac{5\sqrt{6}}{48} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{336} & 0 \\ -\frac{\sqrt{7}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{336} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}}{48} \\ 0 & 0 & 0 & 0 & \frac{5\sqrt{210}}{336} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{25\sqrt{14}}{336} & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 \\ -\frac{25\sqrt{14}}{336} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} \\ 0 & -\frac{5\sqrt{210}}{336} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
433	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{M}_3^{(1,0;a)}(A_2,1)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{7}}{21} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{21}}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}}{21} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{21}}{84} & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{14}}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{14}}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{5\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 \end{bmatrix}$
434	symmetry	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$
	$\mathbb{M}_3^{(1,0;a)}(A_2,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{21} & -\frac{5\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}i}{336} & 0 \\ -\frac{\sqrt{7}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}i}{336} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}i}{48} \\ 0 & 0 & 0 & 0 & -\frac{5\sqrt{210}i}{336} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{25\sqrt{14}i}{336} & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 \\ -\frac{25\sqrt{14}i}{336} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} \\ 0 & -\frac{5\sqrt{210}i}{336} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
435	symmetry	$\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{M}_{3,1}^{(1,0;a)}(E,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{21}i}{63} & 0 & -\frac{\sqrt{42}i}{63} & 0 & 0 & 0 & 0 & \frac{5\sqrt{210}i}{336} & 0 & \frac{5\sqrt{14}i}{112} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}i}{63} & 0 & \frac{\sqrt{21}i}{63} & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}i}{112} & 0 & \frac{5\sqrt{210}i}{336} & 0 & 0 \\ \frac{5\sqrt{70}i}{336} & 0 & \frac{5\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{42}i}{144} & 0 & -\frac{5\sqrt{21}i}{504} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{21}i}{504} & 0 & -\frac{5\sqrt{42}i}{144} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{7}i}{56} & 0 & \frac{5\sqrt{70}i}{336} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & -\frac{\sqrt{105}i}{84} & 0 \end{bmatrix}$
436	symmetry	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_{3,2}^{(1,0;a)}(E,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{21}}{63} & 0 & -\frac{\sqrt{42}}{63} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{210}}{336} & 0 & \frac{5\sqrt{14}}{112} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}}{63} & 0 & \frac{\sqrt{21}}{63} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}}{112} & 0 & \frac{5\sqrt{210}}{336} & 0 & 0 \\ -\frac{5\sqrt{70}}{336} & 0 & \frac{5\sqrt{7}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{42}}{144} & 0 & -\frac{5\sqrt{21}}{504} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{5\sqrt{21}}{504} & 0 & -\frac{5\sqrt{42}}{144} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{7}}{56} & 0 & \frac{5\sqrt{70}}{336} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & -\frac{\sqrt{105}}{84} & 0 \end{bmatrix}$
437	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{M}_{3,1}^{(1,0;a)}(E,2)$	$\begin{bmatrix} \frac{\sqrt{42}}{126} & 0 & 0 & 0 & \frac{\sqrt{210}}{126} & 0 & 0 & -\frac{5\sqrt{7}}{56} & 0 & 0 & 0 & -\frac{5\sqrt{21}}{168} & 0 & 0 \\ 0 & -\frac{\sqrt{210}}{126} & 0 & 0 & 0 & -\frac{\sqrt{42}}{126} & 0 & 0 & -\frac{5\sqrt{21}}{168} & 0 & 0 & 0 & -\frac{5\sqrt{7}}{56} & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{70}}{168} & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 \\ \frac{25\sqrt{21}}{504} & 0 & 0 & 0 & -\frac{5\sqrt{105}}{504} & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 \\ 0 & -\frac{5\sqrt{105}}{504} & 0 & 0 & 0 & \frac{25\sqrt{21}}{504} & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 \\ 0 & 0 & -\frac{5\sqrt{70}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & 0 & \frac{\sqrt{6}}{24} \end{bmatrix}$
438	symmetry	$\sqrt{15}xyz$
	$\mathbb{M}_{3,2}^{(1,0;a)}(E,2)$	$\begin{bmatrix} -\frac{\sqrt{42}i}{126} & 0 & 0 & 0 & \frac{\sqrt{210}i}{126} & 0 & 0 & \frac{5\sqrt{7}i}{56} & 0 & 0 & 0 & -\frac{5\sqrt{21}i}{168} & 0 & 0 \\ 0 & \frac{\sqrt{210}i}{126} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{126} & 0 & 0 & \frac{5\sqrt{21}i}{168} & 0 & 0 & 0 & -\frac{5\sqrt{7}i}{56} & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{70}i}{168} & 0 & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 \\ -\frac{25\sqrt{21}i}{504} & 0 & 0 & 0 & -\frac{5\sqrt{105}i}{504} & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 \\ 0 & \frac{5\sqrt{105}i}{504} & 0 & 0 & 0 & \frac{25\sqrt{21}i}{504} & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 \\ 0 & 0 & \frac{5\sqrt{70}i}{168} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 & \frac{\sqrt{6}i}{24} \end{bmatrix}$
439	symmetry	z
	$\mathbb{M}_{1}^{(1,1;a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
440	symmetry	$-y$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_{1,1}^{(1,1;a)}(E)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
441	symmetry	x
	$\mathbb{M}_{1,2}^{(1,1;a)}(E)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
442	symmetry	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$
	$\mathbb{M}_{3}^{(1,1;a)}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{3}{7} & \frac{\sqrt{42}}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{112} & 0 \\ \frac{3}{7} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{112} \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{30}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{15\sqrt{2}}{112} & -\frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{42} & 0 \\ -\frac{15\sqrt{2}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} \\ 0 & -\frac{3\sqrt{30}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{84} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
443	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{M}_{3}^{(1,1;a)}(A_2,1)$	$\begin{bmatrix} 0 & 0 & \frac{3}{7} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3}{7} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{28} & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{3}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{3}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{84} & 0 & 0 \end{bmatrix}$
444	symmetry	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_{3}^{(1,1;a)}(A_2,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{3i}{7} & \frac{\sqrt{42}i}{112} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{112} & 0 \\ \frac{3i}{7} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{112} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{112} \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{30}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{15\sqrt{2}i}{112} & -\frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{42} & 0 \\ -\frac{15\sqrt{2}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{42} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{84} \\ 0 & -\frac{3\sqrt{30}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{84} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
445	symmetry	$\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{M}_{3,1}^{(1,1;a)}(E,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{3}i}{7} & 0 & \frac{\sqrt{6}i}{7} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{112} & 0 & -\frac{3\sqrt{2}i}{112} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{7} & 0 & -\frac{\sqrt{3}i}{7} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{112} & 0 & -\frac{\sqrt{30}i}{112} & 0 & 0 \\ \frac{3\sqrt{10}i}{112} & 0 & \frac{9i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{84} & 0 & -\frac{\sqrt{3}i}{42} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{16} & 0 & -\frac{\sqrt{3}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{56} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & \frac{i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{9i}{56} & 0 & \frac{3\sqrt{10}i}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{42} & 0 & \frac{\sqrt{15}i}{84} & 0 \end{bmatrix}$
446	symmetry	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{M}_{3,2}^{(1,1;a)}(E,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{3}}{7} & 0 & \frac{\sqrt{6}}{7} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{112} & 0 & -\frac{3\sqrt{2}}{112} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{7} & 0 & -\frac{\sqrt{3}}{7} & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{112} & 0 & -\frac{\sqrt{30}}{112} & 0 & 0 \\ -\frac{3\sqrt{10}}{112} & 0 & \frac{9}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{84} & 0 & -\frac{\sqrt{3}}{42} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{3}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{56} & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & -\frac{1}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{9}{56} & 0 & \frac{3\sqrt{10}}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{42} & 0 & \frac{\sqrt{15}}{84} & 0 \end{bmatrix}$
447	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{M}_{3,1}^{(1,1;a)}(E,2)$	$\begin{bmatrix} -\frac{\sqrt{6}}{14} & 0 & 0 & 0 & -\frac{\sqrt{30}}{14} & 0 & 0 & \frac{3}{56} & 0 & 0 & 0 & \frac{\sqrt{3}}{56} & 0 & 0 \\ 0 & \frac{\sqrt{30}}{14} & 0 & 0 & 0 & \frac{\sqrt{6}}{14} & 0 & 0 & \frac{\sqrt{3}}{56} & 0 & 0 & 0 & \frac{3}{56} & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{10}}{56} & 0 & 0 & \frac{\sqrt{42}}{168} & 0 & 0 & 0 & \frac{\sqrt{30}}{168} & 0 & 0 & 0 \\ \frac{5\sqrt{3}}{56} & 0 & 0 & 0 & -\frac{\sqrt{15}}{56} & 0 & 0 & -\frac{\sqrt{2}}{56} & 0 & 0 & 0 & \frac{\sqrt{6}}{56} & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{56} & 0 & 0 & 0 & \frac{5\sqrt{3}}{56} & 0 & 0 & -\frac{\sqrt{6}}{56} & 0 & 0 & 0 & \frac{\sqrt{2}}{56} & 0 \\ 0 & 0 & -\frac{3\sqrt{10}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{168} & 0 & 0 & 0 & -\frac{\sqrt{42}}{168} \end{bmatrix}$
448	symmetry	$\sqrt{15}xyz$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_{3,2}^{(1,1;a)}(E,2)$	$\begin{bmatrix} \frac{\sqrt{6}i}{14} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{14} & 0 & 0 & -\frac{3i}{56} & 0 & 0 & 0 & \frac{\sqrt{3}i}{56} & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{14} & 0 & 0 & 0 & \frac{\sqrt{6}i}{14} & 0 & 0 & -\frac{\sqrt{3}i}{56} & 0 & 0 & 0 & \frac{3i}{56} & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{10}i}{56} & 0 & 0 & -\frac{\sqrt{42}i}{168} & 0 & 0 & 0 & \frac{\sqrt{30}i}{168} & 0 & 0 & 0 \\ -\frac{5\sqrt{3}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{56} & 0 & 0 & \frac{\sqrt{2}i}{56} & 0 & 0 & 0 & \frac{\sqrt{6}i}{56} & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{56} & 0 & 0 & 0 & \frac{5\sqrt{3}i}{56} & 0 & 0 & \frac{\sqrt{6}i}{56} & 0 & 0 & 0 & \frac{\sqrt{2}i}{56} & 0 \\ 0 & 0 & \frac{3\sqrt{10}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{168} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{168} \end{bmatrix}$

bra: $= \langle \frac{3}{2}, \frac{3}{2}; d| \, , \langle \frac{3}{2}, \frac{1}{2}; d| \, , \langle \frac{3}{2}, -\frac{1}{2}; d| \, , \langle \frac{3}{2}, -\frac{3}{2}; d| \, , \langle \frac{5}{2}, \frac{5}{2}; d| \, , \langle \frac{5}{2}, \frac{3}{2}; d| \, , \langle \frac{5}{2}, \frac{1}{2}; d| \, , \langle \frac{5}{2}, -\frac{1}{2}; d| \, , \langle \frac{5}{2}, -\frac{3}{2}; d| \, , \langle \frac{5}{2}, -\frac{5}{2}; d|$
ket: $= |\frac{3}{2}, \frac{3}{2}; d\rangle \, , |\frac{3}{2}, \frac{1}{2}; d\rangle \, , |\frac{3}{2}, -\frac{1}{2}; d\rangle \, , |\frac{3}{2}, -\frac{3}{2}; d\rangle \, , |\frac{5}{2}, \frac{5}{2}; d\rangle \, , |\frac{5}{2}, \frac{3}{2}; d\rangle \, , |\frac{5}{2}, \frac{1}{2}; d\rangle \, , |\frac{5}{2}, -\frac{1}{2}; d\rangle \, , |\frac{5}{2}, -\frac{3}{2}; d\rangle \, , |\frac{5}{2}, -\frac{5}{2}; d\rangle$

Table 8: (d,d) block.

No.	multipole	matrix
449	symmetry	1
	$\mathbb{Q}_0^{(a)}(A_1)$	$\begin{bmatrix} \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} \end{bmatrix}$
450	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{Q}_2^{(a)}(A_1)$	$\begin{bmatrix} -\frac{\sqrt{7}}{10} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{35} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{7}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{70} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{7}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{70} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{10} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{35} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{7}}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{35} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}}{70} & 0 & 0 & 0 & 0 & \frac{4\sqrt{7}}{35} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}}{70} & 0 & 0 & 0 & 0 & \frac{4\sqrt{7}}{35} & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{7}}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{35} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{7} \end{bmatrix}$
451	symmetry	$\sqrt{3}xz$
	$\mathbb{Q}_{2,1}^{(a)}(E,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{7}}{10} & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & -\frac{3\sqrt{42}}{140} & 0 & 0 & 0 \\ -\frac{\sqrt{7}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{70} & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}}{10} & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & -\frac{\sqrt{7}}{70} & 0 \\ 0 & 0 & \frac{\sqrt{7}}{10} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{42}}{140} & 0 & \frac{\sqrt{105}}{70} \\ \frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{35} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}}{70} & 0 & 0 & -\frac{\sqrt{105}}{35} & 0 & -\frac{\sqrt{42}}{35} & 0 & 0 & 0 \\ -\frac{3\sqrt{42}}{140} & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{42}}{35} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{14}}{28} & 0 & -\frac{3\sqrt{42}}{140} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{35} & 0 \\ 0 & 0 & -\frac{\sqrt{7}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{35} & 0 & \frac{\sqrt{105}}{35} \\ 0 & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{35} & 0 \end{bmatrix}$
452	symmetry	$\sqrt{3}yz$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{Q}_{2,2}^{(a)}(E,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{7}i}{10} & 0 & 0 & \frac{\sqrt{105}i}{70} & 0 & \frac{3\sqrt{42}i}{140} & 0 & 0 & 0 \\ -\frac{\sqrt{7}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{70} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}i}{10} & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{7}i}{70} & 0 \\ 0 & 0 & \frac{\sqrt{7}i}{10} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{42}i}{140} & 0 & -\frac{\sqrt{105}i}{70} \\ -\frac{\sqrt{105}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{35} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{7}i}{70} & 0 & 0 & -\frac{\sqrt{105}i}{35} & 0 & \frac{\sqrt{42}i}{35} & 0 & 0 & 0 \\ -\frac{3\sqrt{42}i}{140} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{42}i}{35} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{14}i}{28} & 0 & \frac{3\sqrt{42}i}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{35} & 0 \\ 0 & 0 & -\frac{\sqrt{7}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{35} & 0 & -\frac{\sqrt{105}i}{35} \\ 0 & 0 & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{35} & 0 \end{bmatrix}$
453	symmetry	$\sqrt{3}xy$
	$\mathbb{Q}_{2,1}^{(a)}(E,2)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{7}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{70} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}i}{10} & \frac{\sqrt{35}i}{35} & 0 & 0 & 0 & \frac{2\sqrt{7}i}{35} & 0 \\ -\frac{\sqrt{7}i}{10} & 0 & 0 & 0 & 0 & \frac{2\sqrt{7}i}{35} & 0 & 0 & 0 & \frac{\sqrt{35}i}{35} \\ 0 & -\frac{\sqrt{7}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{70} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{70} & 0 & 0 & 0 \\ 0 & 0 & -\frac{2\sqrt{7}i}{35} & 0 & 0 & 0 & 0 & \frac{3\sqrt{42}i}{70} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{42}i}{70} & -\frac{\sqrt{210}i}{70} & 0 & 0 & 0 & \frac{3\sqrt{42}i}{70} & 0 \\ -\frac{\sqrt{42}i}{70} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{42}i}{70} & 0 & 0 & 0 & \frac{\sqrt{210}i}{70} \\ 0 & -\frac{2\sqrt{7}i}{35} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{42}i}{70} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{70} & 0 & 0 \end{bmatrix}$
454	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{Q}^{(a)}_{2,2}(E,2)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{7}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{70} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{10} & \frac{\sqrt{35}}{35} & 0 & 0 & 0 & -\frac{2\sqrt{7}}{35} & 0 \\ -\frac{\sqrt{7}}{10} & 0 & 0 & 0 & 0 & \frac{2\sqrt{7}}{35} & 0 & 0 & 0 & -\frac{\sqrt{35}}{35} \\ 0 & -\frac{\sqrt{7}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{70} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{70} & 0 & 0 & 0 \\ 0 & 0 & \frac{2\sqrt{7}}{35} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{42}}{70} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}}{70} & -\frac{\sqrt{210}}{70} & 0 & 0 & 0 & -\frac{3\sqrt{42}}{70} & 0 \\ -\frac{\sqrt{42}}{70} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{42}}{70} & 0 & 0 & 0 & -\frac{\sqrt{210}}{70} \\ 0 & -\frac{2\sqrt{7}}{35} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{42}}{70} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{70} & 0 & 0 \end{bmatrix}$
455	symmetry	$\frac{3x^4}{8}+\frac{3x^2y^2}{4}-3x^2z^2+\frac{3y^4}{8}-3y^2z^2+z^4$
	$\mathbb{Q}^{(a)}_{4}(A_1,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{35} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{35} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}}{70} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{35} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{210}}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{35} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{70} \end{bmatrix}$
456	symmetry	$\frac{\sqrt{70}yz\left(3x^2-y^2\right)}{4}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{Q}_4^{(a)}(A_1,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 \end{bmatrix}$
457	symmetry	$\frac{\sqrt{70}xz\left(x^2-3y^2\right)}{4}$
	$\mathbb{Q}_4^{(a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 \end{bmatrix}$
458	symmetry	$-\frac{\sqrt{10}xz\left(3x^2+3y^2-4z^2\right)}{4}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{Q}_{4,1}^{(a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{140} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & \frac{\sqrt{42}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{70}}{140} \\ -\frac{\sqrt{70}}{140} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}}{28} & 0 & 0 & \frac{\sqrt{70}}{70} & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 \\ \frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}}{14} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 \\ 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{70}}{70} \\ 0 & 0 & 0 & -\frac{\sqrt{70}}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{70} & 0 \end{bmatrix}$
459	symmetry	$-\frac{\sqrt{10}yz\left(3x^2+3y^2-4z^2\right)}{4}$
	$\mathbb{Q}_{4,2}^{(a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{140} & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{14} & 0 & -\frac{\sqrt{42}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{70}i}{140} \\ \frac{\sqrt{70}i}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{70} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & \frac{\sqrt{70}i}{70} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 \\ \frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}i}{14} & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 \\ 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{70}i}{70} \\ 0 & 0 & 0 & -\frac{\sqrt{70}i}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{70} & 0 \end{bmatrix}$
460	symmetry	$-\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{Q}_{4,1}^{(a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{5} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 \end{bmatrix}$
461	symmetry	$\frac{\sqrt{35}\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$
	$\mathbb{Q}_{4,2}^{(a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{5} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{5} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{5} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}}{5} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 \end{bmatrix}$
462	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{Q}_{4,1}^{(a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{70} & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & -\frac{\sqrt{105}i}{70} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{14} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{105}i}{70} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}i}{140} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & \frac{3\sqrt{70}i}{140} & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 \\ \frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & -\frac{3\sqrt{70}i}{140} \\ 0 & -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}i}{140} & 0 & 0 \end{bmatrix}$
463	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$
	$\mathbb{Q}_{4,2}^{(a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & \frac{\sqrt{105}}{70} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{140} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & \frac{3\sqrt{70}}{140} & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 \\ \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & \frac{3\sqrt{70}}{140} \\ 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{140} & 0 & 0 \end{bmatrix}$
464	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{Q}_2^{(1,-1;a)}(A_1)$	$\begin{bmatrix} -\frac{\sqrt{30}}{50} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{30}}{50} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{50} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}}{50} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}}{50} & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}}{50} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{50} & 0 & 0 & 0 & 0 & \frac{3\sqrt{30}}{50} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{15} & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{30}}{50} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{75} & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{5}}{50} & 0 & 0 & 0 & 0 & -\frac{4\sqrt{30}}{75} & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{5}}{50} & 0 & 0 & 0 & 0 & -\frac{4\sqrt{30}}{75} & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{30}}{50} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{75} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{15} \end{bmatrix}$
465	symmetry	$\sqrt{3}xz$
	$\mathbb{Q}_{2,1}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{30}}{50} & 0 & 0 & \frac{3\sqrt{2}}{20} & 0 & -\frac{9\sqrt{5}}{100} & 0 & 0 & 0 \\ -\frac{\sqrt{30}}{50} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{100} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}}{50} & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{30}}{100} & 0 \\ 0 & 0 & \frac{\sqrt{30}}{50} & 0 & 0 & 0 & 0 & -\frac{9\sqrt{5}}{100} & 0 & \frac{3\sqrt{2}}{20} \\ \frac{3\sqrt{2}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{5} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{100} & 0 & 0 & \frac{\sqrt{2}}{5} & 0 & \frac{2\sqrt{5}}{25} & 0 & 0 & 0 \\ -\frac{9\sqrt{5}}{100} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & \frac{2\sqrt{5}}{25} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{20} & 0 & -\frac{9\sqrt{5}}{100} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{5}}{25} & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{100} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{5}}{25} & 0 & -\frac{\sqrt{2}}{5} \\ 0 & 0 & 0 & \frac{3\sqrt{2}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{5} & 0 \end{bmatrix}$
466	symmetry	$\sqrt{3}yz$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{Q}_{2,2}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{30}i}{50} & 0 & 0 & \frac{3\sqrt{2}i}{20} & 0 & \frac{9\sqrt{5}i}{100} & 0 & 0 & 0 \\ -\frac{\sqrt{30}i}{50} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{100} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}i}{50} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{30}i}{100} & 0 \\ 0 & 0 & \frac{\sqrt{30}i}{50} & 0 & 0 & 0 & 0 & -\frac{9\sqrt{5}i}{100} & 0 & -\frac{3\sqrt{2}i}{20} \\ -\frac{3\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{5} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{100} & 0 & 0 & \frac{\sqrt{2}i}{5} & 0 & -\frac{2\sqrt{5}i}{25} & 0 & 0 & 0 \\ -\frac{9\sqrt{5}i}{100} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & \frac{2\sqrt{5}i}{25} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{20} & 0 & \frac{9\sqrt{5}i}{100} & 0 & 0 & 0 & 0 & \frac{2\sqrt{5}i}{25} & 0 \\ 0 & 0 & -\frac{\sqrt{30}i}{100} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{5}i}{25} & 0 & \frac{\sqrt{2}i}{5} \\ 0 & 0 & 0 & \frac{3\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{5} & 0 \end{bmatrix}$
467	symmetry	$\sqrt{3}xy$
	$\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{30}i}{50} & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}i}{50} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{50} & \frac{\sqrt{6}i}{10} & 0 & 0 & 0 & \frac{\sqrt{30}i}{25} & 0 \\ -\frac{\sqrt{30}i}{50} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{25} & 0 & 0 & 0 & \frac{\sqrt{6}i}{10} \\ 0 & -\frac{\sqrt{30}i}{50} & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}i}{50} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{10} & 0 & 0 & 0 & 0 & -\frac{i}{5} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{30}i}{25} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}i}{25} & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{5}i}{50} & \frac{i}{5} & 0 & 0 & 0 & -\frac{3\sqrt{5}i}{25} & 0 \\ -\frac{3\sqrt{5}i}{50} & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}i}{25} & 0 & 0 & 0 & -\frac{i}{5} \\ 0 & -\frac{\sqrt{30}i}{25} & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}i}{25} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{10} & 0 & 0 & 0 & 0 & \frac{i}{5} & 0 & 0 \end{bmatrix}$
468	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{30}}{50} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}}{50} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{50} & \frac{\sqrt{6}}{10} & 0 & 0 & 0 & -\frac{\sqrt{30}}{25} & 0 \\ -\frac{\sqrt{30}}{50} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{25} & 0 & 0 & 0 & -\frac{\sqrt{6}}{10} \\ 0 & -\frac{\sqrt{30}}{50} & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}}{50} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{10} & 0 & 0 & 0 & 0 & \frac{1}{5} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}}{25} & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}}{25} & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{5}}{50} & \frac{1}{5} & 0 & 0 & 0 & \frac{3\sqrt{5}}{25} & 0 \\ -\frac{3\sqrt{5}}{50} & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}}{25} & 0 & 0 & 0 & \frac{1}{5} \\ 0 & -\frac{\sqrt{30}}{25} & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}}{25} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{10} & 0 & 0 & 0 & 0 & \frac{1}{5} & 0 & 0 \end{bmatrix}$
469	symmetry	$\frac{3x^4}{8}+\frac{3x^2y^2}{4}-3x^2z^2+\frac{3y^4}{8}-3y^2z^2+z^4$
	$\mathbb{Q}_4^{(1,-1;a)}(A_1,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{70} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}}{35} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}}{70} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{35}}{35} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{210}}{70} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{35}}{35} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}}{35} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{35} \end{bmatrix}$
470	symmetry	$\frac{\sqrt{70}yz\left(3x^2-y^2\right)}{4}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{Q}_4^{(1,-1;a)}(A_1,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{40} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{40} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}i}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{5} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{5} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{5} & 0 & 0 & 0 \end{bmatrix}$
471	symmetry	$\frac{\sqrt{70}xz\left(x^2-3y^2\right)}{4}$
	$\mathbb{Q}_4^{(1,-1;a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{40} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{40} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{5} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{5} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{5} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{5} & 0 & 0 & 0 \end{bmatrix}$
472	symmetry	$-\frac{\sqrt{10}xz\left(3x^2+3y^2-4z^2\right)}{4}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{Q}_{4,1}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{280} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{42}}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{70}}{280} \\ -\frac{\sqrt{70}}{280} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{35} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}}{56} & 0 & 0 & -\frac{\sqrt{70}}{35} & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 \\ \frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{7} & 0 \\ 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{7} & 0 & \frac{\sqrt{70}}{35} \\ 0 & 0 & 0 & -\frac{\sqrt{70}}{280} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{35} & 0 \end{bmatrix}$
473	symmetry	$-\frac{\sqrt{10}yz\left(3x^2+3y^2-4z^2\right)}{4}$
	$\mathbb{Q}_{4,2}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{280} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{42}i}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{70}i}{280} \\ \frac{\sqrt{70}i}{280} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{35} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & -\frac{\sqrt{70}i}{35} & 0 & -\frac{\sqrt{7}i}{7} & 0 & 0 & 0 \\ \frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & \frac{\sqrt{7}i}{7} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{7} & 0 \\ 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{7} & 0 & -\frac{\sqrt{70}i}{35} \\ 0 & 0 & 0 & -\frac{\sqrt{70}i}{280} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{35} & 0 \end{bmatrix}$
474	symmetry	$-\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{Q}_{4,1}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{5} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{5} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 \end{bmatrix}$
475	symmetry	$\frac{\sqrt{35}\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$
	$\mathbb{Q}_{4,2}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{5} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{5} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{5} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{5} & 0 & 0 & 0 & 0 \end{bmatrix}$
476	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{Q}_{4,1}^{(1,-1;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{140} & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{105}i}{140} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{105}i}{140} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}i}{70} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{14} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & -\frac{3\sqrt{70}i}{70} & 0 & 0 & 0 & -\frac{\sqrt{14}i}{14} & 0 \\ \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 & 0 & 0 & \frac{3\sqrt{70}i}{70} \\ 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{105}i}{140} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}i}{70} & 0 & 0 \end{bmatrix}$
477	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$
	$\mathbb{Q}_{4,2}^{(1,-1;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & \frac{\sqrt{105}}{140} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}}{140} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}}{70} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & -\frac{3\sqrt{70}}{70} & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 \\ \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & -\frac{3\sqrt{70}}{70} \\ 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{105}}{140} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}}{70} & 0 & 0 \end{bmatrix}$
478	symmetry	1

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{Q}_0^{(1,1;a)}(A_1)$	$\begin{bmatrix} -\frac{\sqrt{15}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} \end{bmatrix}$
479	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{Q}_2^{(1,1;a)}(A_1)$	$\begin{bmatrix} \frac{\sqrt{105}}{25} & 0 & 0 & 0 & 0 & -\frac{4\sqrt{105}}{175} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}}{25} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{70}}{175} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{105}}{25} & 0 & 0 & 0 & 0 & \frac{2\sqrt{70}}{175} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{105}}{25} & 0 & 0 & 0 & 0 & \frac{4\sqrt{105}}{175} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & 0 \\ -\frac{4\sqrt{105}}{175} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{350} & 0 & 0 & 0 & 0 \\ 0 & -\frac{2\sqrt{70}}{175} & 0 & 0 & 0 & 0 & \frac{2\sqrt{105}}{175} & 0 & 0 & 0 \\ 0 & 0 & \frac{2\sqrt{70}}{175} & 0 & 0 & 0 & 0 & \frac{2\sqrt{105}}{175} & 0 & 0 \\ 0 & 0 & 0 & \frac{4\sqrt{105}}{175} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{350} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} \end{bmatrix}$
480	symmetry	$\sqrt{3}xz$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{Q}_{2,1}^{(1,1;a)}(E,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{105}}{25} & 0 & 0 & \frac{2\sqrt{7}}{35} & 0 & -\frac{3\sqrt{70}}{175} & 0 & 0 & 0 \\ \frac{\sqrt{105}}{25} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{105}}{525} & 0 & -\frac{\sqrt{210}}{105} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{105}}{25} & 0 & 0 & -\frac{\sqrt{210}}{105} & 0 & -\frac{2\sqrt{105}}{525} & 0 \\ 0 & 0 & -\frac{\sqrt{105}}{25} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}}{175} & 0 & \frac{2\sqrt{7}}{35} \\ \frac{2\sqrt{7}}{35} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{70} & 0 & 0 & 0 & 0 \\ 0 & -\frac{2\sqrt{105}}{525} & 0 & 0 & -\frac{3\sqrt{7}}{70} & 0 & -\frac{3\sqrt{70}}{350} & 0 & 0 & 0 \\ -\frac{3\sqrt{70}}{175} & 0 & -\frac{\sqrt{210}}{105} & 0 & 0 & -\frac{3\sqrt{70}}{350} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}}{105} & 0 & -\frac{3\sqrt{70}}{175} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{350} & 0 \\ 0 & 0 & -\frac{2\sqrt{105}}{525} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{350} & 0 & \frac{3\sqrt{7}}{70} \\ 0 & 0 & 0 & \frac{2\sqrt{7}}{35} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{70} & 0 \end{bmatrix}$
481	symmetry	$\sqrt{3}yz$
	$\mathbb{Q}_{2,2}^{(1,1;a)}(E,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{105}i}{25} & 0 & 0 & \frac{2\sqrt{7}i}{35} & 0 & \frac{3\sqrt{70}i}{175} & 0 & 0 & 0 \\ \frac{\sqrt{105}i}{25} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{105}i}{525} & 0 & \frac{\sqrt{210}i}{105} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{105}i}{25} & 0 & 0 & -\frac{\sqrt{210}i}{105} & 0 & \frac{2\sqrt{105}i}{525} & 0 \\ 0 & 0 & -\frac{\sqrt{105}i}{25} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}i}{175} & 0 & -\frac{2\sqrt{7}i}{35} \\ -\frac{2\sqrt{7}i}{35} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{70} & 0 & 0 & 0 & 0 \\ 0 & \frac{2\sqrt{105}i}{525} & 0 & 0 & -\frac{3\sqrt{7}i}{70} & 0 & \frac{3\sqrt{70}i}{350} & 0 & 0 & 0 \\ -\frac{3\sqrt{70}i}{175} & 0 & \frac{\sqrt{210}i}{105} & 0 & 0 & -\frac{3\sqrt{70}i}{350} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}i}{105} & 0 & \frac{3\sqrt{70}i}{175} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}i}{350} & 0 \\ 0 & 0 & -\frac{2\sqrt{105}i}{525} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}i}{350} & 0 & -\frac{3\sqrt{7}i}{70} \\ 0 & 0 & 0 & \frac{2\sqrt{7}i}{35} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{70} & 0 \end{bmatrix}$
482	symmetry	$\sqrt{3}xy$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{Q}_{2,1}^{(1,1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{105}i}{25} & 0 & 0 & 0 & 0 & \frac{2\sqrt{70}i}{175} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{105}i}{25} & \frac{4\sqrt{21}i}{105} & 0 & 0 & 0 & \frac{8\sqrt{105}i}{525} & 0 \\ \frac{\sqrt{105}i}{25} & 0 & 0 & 0 & 0 & \frac{8\sqrt{105}i}{525} & 0 & 0 & 0 & \frac{4\sqrt{21}i}{105} \\ 0 & \frac{\sqrt{105}i}{25} & 0 & 0 & 0 & 0 & \frac{2\sqrt{70}i}{175} & 0 & 0 & 0 \\ 0 & -\frac{4\sqrt{21}i}{105} & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}i}{140} & 0 & 0 & 0 \\ 0 & 0 & -\frac{8\sqrt{105}i}{525} & 0 & 0 & 0 & 0 & \frac{9\sqrt{70}i}{700} & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{70}i}{175} & -\frac{3\sqrt{14}i}{140} & 0 & 0 & 0 & \frac{9\sqrt{70}i}{700} & 0 \\ -\frac{2\sqrt{70}i}{175} & 0 & 0 & 0 & 0 & -\frac{9\sqrt{70}i}{700} & 0 & 0 & 0 & \frac{3\sqrt{14}i}{140} \\ 0 & -\frac{8\sqrt{105}i}{525} & 0 & 0 & 0 & 0 & -\frac{9\sqrt{70}i}{700} & 0 & 0 & 0 \\ 0 & 0 & -\frac{4\sqrt{21}i}{105} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{140} & 0 & 0 \end{bmatrix}$
483	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{Q}_{2,2}^{(1,1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{105}}{25} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{70}}{175} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{105}}{25} & \frac{4\sqrt{21}}{105} & 0 & 0 & 0 & -\frac{8\sqrt{105}}{525} & 0 \\ \frac{\sqrt{105}}{25} & 0 & 0 & 0 & 0 & \frac{8\sqrt{105}}{525} & 0 & 0 & 0 & -\frac{4\sqrt{21}}{105} \\ 0 & \frac{\sqrt{105}}{25} & 0 & 0 & 0 & 0 & \frac{2\sqrt{70}}{175} & 0 & 0 & 0 \\ 0 & \frac{4\sqrt{21}}{105} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{140} & 0 & 0 & 0 \\ 0 & 0 & \frac{8\sqrt{105}}{525} & 0 & 0 & 0 & 0 & -\frac{9\sqrt{70}}{700} & 0 & 0 \\ 0 & 0 & 0 & \frac{2\sqrt{70}}{175} & -\frac{3\sqrt{14}}{140} & 0 & 0 & 0 & -\frac{9\sqrt{70}}{700} & 0 \\ -\frac{2\sqrt{70}}{175} & 0 & 0 & 0 & 0 & -\frac{9\sqrt{70}}{700} & 0 & 0 & 0 & -\frac{3\sqrt{14}}{140} \\ 0 & -\frac{8\sqrt{105}}{525} & 0 & 0 & 0 & 0 & -\frac{9\sqrt{70}}{700} & 0 & 0 & 0 \\ 0 & 0 & -\frac{4\sqrt{21}}{105} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{140} & 0 & 0 \end{bmatrix}$
484	symmetry	z

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{G}_1^{(1,0;a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
485	symmetry	$-y$
	$\mathbb{G}_{1,1}^{(1,0;a)}(E)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{30}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{2}}{4} \\ \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
486	symmetry	x

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{G}_{1,2}^{(1,0;a)}(E)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{30}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{2}i}{4} \\ -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
487	symmetry	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$
	$\mathbb{G}_{3}^{(1,0;a)}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{8} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
488	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{G}_3^{(1,0;a)}(A_2,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{10} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
489	symmetry	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$
	$\mathbb{G}_3^{(1,0;a)}(A_2,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{8} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
490	symmetry	$\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{G}_{3,1}^{(1,0;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & -\frac{3\sqrt{5}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{7\sqrt{30}}{120} & 0 & \frac{\sqrt{15}}{60} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{60} & 0 & \frac{7\sqrt{30}}{120} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}}{20} & 0 & -\frac{\sqrt{2}}{8} \\ -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{7\sqrt{30}}{120} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{5}}{20} & 0 & \frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}}{60} & 0 & -\frac{3\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{7\sqrt{30}}{120} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
491	symmetry	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{G}_{3,2}^{(1,0;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & \frac{3\sqrt{5}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{7\sqrt{30}i}{120} & 0 & -\frac{\sqrt{15}i}{60} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{60} & 0 & -\frac{7\sqrt{30}i}{120} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}i}{20} & 0 & \frac{\sqrt{2}i}{8} \\ \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{7\sqrt{30}i}{120} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{5}i}{20} & 0 & -\frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{60} & 0 & \frac{3\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{7\sqrt{30}i}{120} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
492	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{G}_{3,1}^{(1,0;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{12} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & \frac{\sqrt{15}i}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
493	symmetry	$\sqrt{15}xyz$
	$\mathbb{G}_{3,2}^{(1,0;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{12} & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & -\frac{\sqrt{15}}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
494	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{T}_2^{(1,0;a)}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{42}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
495	symmetry	$\sqrt{3}xz$
	$\mathbb{T}_{2,1}^{(1,0;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 & \frac{3\sqrt{7}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & \frac{5\sqrt{21}i}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{21}i}{84} & 0 & \frac{\sqrt{42}i}{84} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{28} & 0 & -\frac{\sqrt{70}i}{28} \\ \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{7}i}{28} & 0 & -\frac{5\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{21}i}{84} & 0 & -\frac{3\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
496	symmetry	$\sqrt{3}yz$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{T}^{(1,0;a)}_{2,2}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{28} & 0 & \frac{3\sqrt{7}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & \frac{5\sqrt{21}}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{21}}{84} & 0 & \frac{\sqrt{42}}{84} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{28} & 0 & -\frac{\sqrt{70}}{28} \\ \frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{7}}{28} & 0 & -\frac{5\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{21}}{84} & 0 & -\frac{3\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
497	symmetry	$\sqrt{3}xy$
	$\mathbb{T}^{(1,0;a)}_{2,1}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{42} & 0 & 0 & 0 & \frac{\sqrt{42}}{21} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{21} & 0 & 0 & 0 & \frac{\sqrt{210}}{42} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{210}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{210}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
498	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{T}_{2,2}^{(1,0;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{42} & 0 & 0 & 0 & \frac{\sqrt{42}i}{21} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{21} & 0 & 0 & 0 & \frac{\sqrt{210}i}{42} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{210}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{210}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
499	symmetry	$\frac{3x^4}{8}+\frac{3x^2y^2}{4}-3x^2z^2+\frac{3y^4}{8}-3y^2z^2+z^4$
	$\mathbb{T}_{4}^{(1,0;a)}(A_1,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
500	symmetry	$\frac{\sqrt{70}yz\left(3x^2-y^2\right)}{4}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{T}_4^{(1,0;a)}(A_1,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{8} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{10}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
501	symmetry	$\frac{\sqrt{70}xz\left(x^2-3y^2\right)}{4}$
	$\mathbb{T}_4^{(1,0;a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{8} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{10}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
502	symmetry	$-\frac{\sqrt{10}xz\left(3x^2+3y^2-4z^2\right)}{4}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{T}_{4,1}^{(1,0;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{56} & 0 & \frac{\sqrt{105}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{28} & 0 & -\frac{\sqrt{210}i}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & \frac{\sqrt{14}i}{56} \\ -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{210}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{35}i}{28} & 0 & -\frac{\sqrt{105}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}i}{28} & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{210}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
503	symmetry	$-\frac{\sqrt{10}yz\left(3x^2+3y^2-4z^2\right)}{4}$
	$\mathbb{T}_{4,2}^{(1,0;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & \frac{\sqrt{105}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{28} & 0 & -\frac{\sqrt{210}}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & \frac{\sqrt{14}}{56} \\ -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{35}}{28} & 0 & -\frac{\sqrt{105}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{105}}{28} & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
504	symmetry	$-\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{T}_{4,1}^{(1,0;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
505	symmetry	$\frac{\sqrt{35}\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$
	$\mathbb{T}_{4,2}^{(1,0;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
506	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{T}_{4,1}^{(1,0;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & \frac{\sqrt{105}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{28} & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{105}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{105}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
507	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$
	$\mathbb{T}_{4,2}^{(1,0;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & \frac{\sqrt{105}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{105}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
508	symmetry	z

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_1^{(a)}(A_2)$	$\begin{bmatrix} \frac{9\sqrt{5}}{50} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{25} & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{5}}{50} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{50} & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{5}}{50} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{50} & 0 & 0 \\ 0 & 0 & 0 & -\frac{9\sqrt{5}}{50} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{25} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{5} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}}{25} & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}}{25} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{50} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{25} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}}{50} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{25} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{25} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}}{25} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{5} \end{bmatrix}$
509	symmetry	$-y$
	$\mathbb{M}_{1,1}^{(a)}(E)$	$\begin{bmatrix} 0 & \frac{3\sqrt{15}i}{50} & 0 & 0 & \frac{i}{10} & 0 & \frac{\sqrt{10}i}{100} & 0 & 0 & 0 \\ -\frac{3\sqrt{15}i}{50} & 0 & \frac{3\sqrt{5}i}{25} & 0 & 0 & \frac{\sqrt{15}i}{50} & 0 & \frac{\sqrt{30}i}{100} & 0 & 0 \\ 0 & -\frac{3\sqrt{5}i}{25} & 0 & \frac{3\sqrt{15}i}{50} & 0 & 0 & \frac{\sqrt{30}i}{100} & 0 & \frac{\sqrt{15}i}{50} & 0 \\ 0 & 0 & -\frac{3\sqrt{15}i}{50} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{100} & 0 & \frac{i}{10} \\ -\frac{i}{10} & 0 & 0 & 0 & 0 & \frac{i}{5} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{50} & 0 & 0 & -\frac{i}{5} & 0 & \frac{2\sqrt{10}i}{25} & 0 & 0 & 0 \\ -\frac{\sqrt{10}i}{100} & 0 & -\frac{\sqrt{30}i}{100} & 0 & 0 & -\frac{2\sqrt{10}i}{25} & 0 & \frac{3\sqrt{5}i}{25} & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{100} & 0 & -\frac{\sqrt{10}i}{100} & 0 & 0 & -\frac{3\sqrt{5}i}{25} & 0 & \frac{2\sqrt{10}i}{25} & 0 \\ 0 & 0 & -\frac{\sqrt{15}i}{50} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{10}i}{25} & 0 & \frac{i}{5} \\ 0 & 0 & 0 & -\frac{i}{10} & 0 & 0 & 0 & 0 & -\frac{i}{5} & 0 \end{bmatrix}$
510	symmetry	x

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}^{(a)}_{1,2}(E)$	$\begin{bmatrix} 0 & \frac{3\sqrt{15}}{50} & 0 & 0 & -\frac{1}{10} & 0 & \frac{\sqrt{10}}{100} & 0 & 0 & 0 \\ \frac{3\sqrt{15}}{50} & 0 & \frac{3\sqrt{5}}{25} & 0 & 0 & -\frac{\sqrt{15}}{50} & 0 & \frac{\sqrt{30}}{100} & 0 & 0 \\ 0 & \frac{3\sqrt{5}}{25} & 0 & \frac{3\sqrt{15}}{50} & 0 & 0 & -\frac{\sqrt{30}}{100} & 0 & \frac{\sqrt{15}}{50} & 0 \\ 0 & 0 & \frac{3\sqrt{15}}{50} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{100} & 0 & \frac{1}{10} \\ -\frac{1}{10} & 0 & 0 & 0 & 0 & \frac{1}{5} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{50} & 0 & 0 & \frac{1}{5} & 0 & \frac{2\sqrt{10}}{25} & 0 & 0 & 0 \\ \frac{\sqrt{10}}{100} & 0 & -\frac{\sqrt{30}}{100} & 0 & 0 & \frac{2\sqrt{10}}{25} & 0 & \frac{3\sqrt{5}}{25} & 0 & 0 \\ 0 & \frac{\sqrt{30}}{100} & 0 & -\frac{\sqrt{10}}{100} & 0 & 0 & \frac{3\sqrt{5}}{25} & 0 & \frac{2\sqrt{10}}{25} & 0 \\ 0 & 0 & \frac{\sqrt{15}}{50} & 0 & 0 & 0 & 0 & \frac{2\sqrt{10}}{25} & 0 & \frac{1}{5} \\ 0 & 0 & 0 & \frac{1}{10} & 0 & 0 & 0 & 0 & \frac{1}{5} & 0 \end{bmatrix}$
511	symmetry	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$
	$\mathbb{M}^{(a)}_{3}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}}{5} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{5} & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{2}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{5} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{2}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{5} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 \end{bmatrix}$
512	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_3^{(a)}(A_2,1)$	$\begin{bmatrix} -\frac{\sqrt{5}}{25} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}}{25} & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{5}}{25} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{25} & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{5}}{25} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{25} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{25} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}}{25} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{5}}{25} & 0 & 0 & 0 & 0 & \frac{7\sqrt{5}}{50} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{25} & 0 & 0 & 0 & 0 & \frac{2\sqrt{5}}{25} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}}{25} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{5}}{25} & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{5}}{25} & 0 & 0 & 0 & 0 & -\frac{7\sqrt{5}}{50} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} \end{bmatrix}$
513	symmetry	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$
	$\mathbb{M}_3^{(a)}(A_2,2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{2}i}{5} & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{5} & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{5} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{5} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 \end{bmatrix}$
514	symmetry	$\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_{3,1}^{(a)}(E,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{10}i}{25} & 0 & 0 & -\frac{\sqrt{6}i}{20} & 0 & -\frac{3\sqrt{15}i}{50} & 0 & 0 & 0 \\ \frac{\sqrt{10}i}{25} & 0 & \frac{\sqrt{30}i}{25} & 0 & 0 & \frac{7\sqrt{10}i}{100} & 0 & \frac{\sqrt{5}i}{50} & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{25} & 0 & -\frac{\sqrt{10}i}{25} & 0 & 0 & \frac{\sqrt{5}i}{50} & 0 & \frac{7\sqrt{10}i}{100} & 0 \\ 0 & 0 & \frac{\sqrt{10}i}{25} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{15}i}{50} & 0 & -\frac{\sqrt{6}i}{20} \\ \frac{\sqrt{6}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{10} & 0 & 0 & 0 & 0 \\ 0 & -\frac{7\sqrt{10}i}{100} & 0 & 0 & \frac{\sqrt{6}i}{10} & 0 & \frac{\sqrt{15}i}{50} & 0 & 0 & 0 \\ \frac{3\sqrt{15}i}{50} & 0 & -\frac{\sqrt{5}i}{50} & 0 & 0 & -\frac{\sqrt{15}i}{50} & 0 & \frac{\sqrt{30}i}{25} & 0 & 0 \\ 0 & -\frac{\sqrt{5}i}{50} & 0 & \frac{3\sqrt{15}i}{50} & 0 & 0 & -\frac{\sqrt{30}i}{25} & 0 & \frac{\sqrt{15}i}{50} & 0 \\ 0 & 0 & -\frac{7\sqrt{10}i}{100} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{50} & 0 & -\frac{\sqrt{6}i}{10} \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{10} & 0 \end{bmatrix}$
515	symmetry	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{M}_{3,2}^{(a)}(E,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{10}}{25} & 0 & 0 & \frac{\sqrt{6}}{20} & 0 & -\frac{3\sqrt{15}}{50} & 0 & 0 & 0 \\ -\frac{\sqrt{10}}{25} & 0 & \frac{\sqrt{30}}{25} & 0 & 0 & -\frac{7\sqrt{10}}{100} & 0 & \frac{\sqrt{5}}{50} & 0 & 0 \\ 0 & \frac{\sqrt{30}}{25} & 0 & -\frac{\sqrt{10}}{25} & 0 & 0 & -\frac{\sqrt{5}}{50} & 0 & \frac{7\sqrt{10}}{100} & 0 \\ 0 & 0 & -\frac{\sqrt{10}}{25} & 0 & 0 & 0 & 0 & \frac{3\sqrt{15}}{50} & 0 & -\frac{\sqrt{6}}{20} \\ \frac{\sqrt{6}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{10} & 0 & 0 & 0 & 0 \\ 0 & -\frac{7\sqrt{10}}{100} & 0 & 0 & -\frac{\sqrt{6}}{10} & 0 & \frac{\sqrt{15}}{50} & 0 & 0 & 0 \\ -\frac{3\sqrt{15}}{50} & 0 & -\frac{\sqrt{5}}{50} & 0 & 0 & \frac{\sqrt{15}}{50} & 0 & \frac{\sqrt{30}}{25} & 0 & 0 \\ 0 & \frac{\sqrt{5}}{50} & 0 & \frac{3\sqrt{15}}{50} & 0 & 0 & \frac{\sqrt{30}}{25} & 0 & \frac{\sqrt{15}}{50} & 0 \\ 0 & 0 & \frac{7\sqrt{10}}{100} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{50} & 0 & -\frac{\sqrt{6}}{10} \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{10} & 0 \end{bmatrix}$
516	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_{3,1}^{(a)}(E,2)$	$\begin{bmatrix} 0 & 0 & \frac{1}{5} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{10} & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{5} & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & \frac{1}{10} & 0 \\ \frac{1}{5} & 0 & 0 & 0 & 0 & \frac{1}{10} & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & -\frac{1}{5} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{10} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 \\ 0 & 0 & \frac{1}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{20} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{10} & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & -\frac{\sqrt{6}}{20} & 0 \\ \frac{\sqrt{6}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{20} & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} \\ 0 & \frac{1}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{20} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 \end{bmatrix}$
517	symmetry	$\sqrt{15}xyz$
	$\mathbb{M}_{3,2}^{(a)}(E,2)$	$\begin{bmatrix} 0 & 0 & \frac{i}{5} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{10} & 0 & 0 \\ 0 & 0 & 0 & -\frac{i}{5} & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & \frac{i}{10} & 0 \\ -\frac{i}{5} & 0 & 0 & 0 & 0 & -\frac{i}{10} & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} \\ 0 & \frac{i}{5} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{10} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 \\ 0 & 0 & \frac{i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{20} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{10} & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{20} & 0 \\ -\frac{\sqrt{6}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{20} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} \\ 0 & -\frac{i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{20} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 \end{bmatrix}$
518	symmetry	z

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_1^{(1,-1;a)}(A_2)$	$\begin{bmatrix} -\frac{3\sqrt{10}}{50} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{10}}{25} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{50} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}}{25} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}}{50} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}}{25} & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{10}}{50} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{10}}{25} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 \\ -\frac{2\sqrt{10}}{25} & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{50} & 0 & 0 & 0 & 0 \\ 0 & -\frac{2\sqrt{15}}{25} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{50} & 0 & 0 & 0 \\ 0 & 0 & -\frac{2\sqrt{15}}{25} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{50} & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{10}}{25} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{50} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{10} \end{bmatrix}$
519	symmetry	$-y$
	$\mathbb{M}_{1,1}^{(1,-1;a)}(E)$	$\begin{bmatrix} 0 & -\frac{\sqrt{30}i}{50} & 0 & 0 & -\frac{\sqrt{2}i}{5} & 0 & -\frac{\sqrt{5}i}{25} & 0 & 0 & 0 \\ \frac{\sqrt{30}i}{50} & 0 & -\frac{\sqrt{10}i}{25} & 0 & 0 & -\frac{\sqrt{30}i}{25} & 0 & -\frac{\sqrt{15}i}{25} & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{25} & 0 & -\frac{\sqrt{30}i}{50} & 0 & 0 & -\frac{\sqrt{15}i}{25} & 0 & -\frac{\sqrt{30}i}{25} & 0 \\ 0 & 0 & \frac{\sqrt{30}i}{50} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{25} & 0 & -\frac{\sqrt{2}i}{5} \\ \frac{\sqrt{2}i}{5} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{10} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{25} & 0 & 0 & -\frac{\sqrt{2}i}{10} & 0 & \frac{2\sqrt{5}i}{25} & 0 & 0 & 0 \\ \frac{\sqrt{5}i}{25} & 0 & \frac{\sqrt{15}i}{25} & 0 & 0 & -\frac{2\sqrt{5}i}{25} & 0 & \frac{3\sqrt{10}i}{50} & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{25} & 0 & \frac{\sqrt{5}i}{25} & 0 & 0 & -\frac{3\sqrt{10}i}{50} & 0 & \frac{2\sqrt{5}i}{25} & 0 \\ 0 & 0 & \frac{\sqrt{30}i}{25} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{5}i}{25} & 0 & \frac{\sqrt{2}i}{10} \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{5} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{10} & 0 \end{bmatrix}$
520	symmetry	x

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_{1,2}^{(1,-1;a)}(E)$	$\begin{bmatrix} 0 & -\frac{\sqrt{30}}{50} & 0 & 0 & \frac{\sqrt{2}}{5} & 0 & -\frac{\sqrt{5}}{25} & 0 & 0 & 0 \\ -\frac{\sqrt{30}}{50} & 0 & -\frac{\sqrt{10}}{25} & 0 & 0 & \frac{\sqrt{30}}{25} & 0 & -\frac{\sqrt{15}}{25} & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{25} & 0 & -\frac{\sqrt{30}}{50} & 0 & 0 & \frac{\sqrt{15}}{25} & 0 & -\frac{\sqrt{30}}{25} & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{50} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{25} & 0 & -\frac{\sqrt{2}}{5} \\ \frac{\sqrt{2}}{5} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{10} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{25} & 0 & 0 & \frac{\sqrt{2}}{10} & 0 & \frac{2\sqrt{5}}{25} & 0 & 0 & 0 \\ -\frac{\sqrt{5}}{25} & 0 & \frac{\sqrt{15}}{25} & 0 & 0 & \frac{2\sqrt{5}}{25} & 0 & \frac{3\sqrt{10}}{50} & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{25} & 0 & \frac{\sqrt{5}}{25} & 0 & 0 & \frac{3\sqrt{10}}{50} & 0 & \frac{2\sqrt{5}}{25} & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{25} & 0 & 0 & 0 & 0 & \frac{2\sqrt{5}}{25} & 0 & \frac{\sqrt{2}}{10} \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{5} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{10} & 0 \end{bmatrix}$
521	symmetry	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$
	$\mathbb{M}_{3}^{(1,-1;a)}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{42}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{35} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{35} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{35} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{42}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{35} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{70}}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{35} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{42}}{35} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{42}}{35} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{35} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{35} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{42}}{35} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{42}}{35} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{70}}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{35} & 0 & 0 & 0 \end{bmatrix}$
522	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_3^{(1,-1;a)}(A_2,1)$	$\begin{bmatrix} \frac{\sqrt{105}}{350} & 0 & 0 & 0 & 0 & \frac{4\sqrt{105}}{175} & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{105}}{350} & 0 & 0 & 0 & 0 & -\frac{4\sqrt{70}}{175} & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{105}}{350} & 0 & 0 & 0 & 0 & -\frac{4\sqrt{70}}{175} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{105}}{350} & 0 & 0 & 0 & 0 & \frac{4\sqrt{105}}{175} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{35} & 0 & 0 & 0 & 0 & 0 \\ \frac{4\sqrt{105}}{175} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{25} & 0 & 0 & 0 & 0 \\ 0 & -\frac{4\sqrt{70}}{175} & 0 & 0 & 0 & 0 & \frac{4\sqrt{105}}{175} & 0 & 0 & 0 \\ 0 & 0 & -\frac{4\sqrt{70}}{175} & 0 & 0 & 0 & 0 & -\frac{4\sqrt{105}}{175} & 0 & 0 \\ 0 & 0 & 0 & \frac{4\sqrt{105}}{175} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{25} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{35} \end{bmatrix}$
523	symmetry	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$
	$\mathbb{M}_3^{(1,-1;a)}(A_2,2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{42}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{35} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{35} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{35} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{42}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{35} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{70}i}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{35} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{35} & 0 & 0 & 0 & 0 & \frac{2\sqrt{42}i}{35} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{35} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{35} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{42}i}{35} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{42}i}{35} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{70}i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{35} & 0 & 0 & 0 \end{bmatrix}$
524	symmetry	$\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_{3,1}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{210}i}{350} & 0 & 0 & \frac{\sqrt{14}i}{35} & 0 & \frac{6\sqrt{35}i}{175} & 0 & 0 & 0 \\ -\frac{\sqrt{210}i}{350} & 0 & -\frac{3\sqrt{70}i}{350} & 0 & 0 & -\frac{\sqrt{210}i}{75} & 0 & -\frac{2\sqrt{105}i}{525} & 0 & 0 \\ 0 & \frac{3\sqrt{70}i}{350} & 0 & \frac{\sqrt{210}i}{350} & 0 & 0 & -\frac{2\sqrt{105}i}{525} & 0 & -\frac{\sqrt{210}i}{75} & 0 \\ 0 & 0 & -\frac{\sqrt{210}i}{350} & 0 & 0 & 0 & 0 & \frac{6\sqrt{35}i}{175} & 0 & \frac{\sqrt{14}i}{35} \\ -\frac{\sqrt{14}i}{35} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{35} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{210}i}{75} & 0 & 0 & \frac{3\sqrt{14}i}{35} & 0 & \frac{3\sqrt{35}i}{175} & 0 & 0 & 0 \\ -\frac{6\sqrt{35}i}{175} & 0 & \frac{2\sqrt{105}i}{525} & 0 & 0 & -\frac{3\sqrt{35}i}{175} & 0 & \frac{6\sqrt{70}i}{175} & 0 & 0 \\ 0 & \frac{2\sqrt{105}i}{525} & 0 & -\frac{6\sqrt{35}i}{175} & 0 & 0 & -\frac{6\sqrt{70}i}{175} & 0 & \frac{3\sqrt{35}i}{175} & 0 \\ 0 & 0 & \frac{\sqrt{210}i}{75} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}i}{175} & 0 & -\frac{3\sqrt{14}i}{35} \\ 0 & 0 & 0 & -\frac{\sqrt{14}i}{35} & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}i}{35} & 0 \end{bmatrix}$
525	symmetry	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{M}_{3,2}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{210}}{350} & 0 & 0 & -\frac{\sqrt{14}}{35} & 0 & \frac{6\sqrt{35}}{175} & 0 & 0 & 0 \\ \frac{\sqrt{210}}{350} & 0 & -\frac{3\sqrt{70}}{350} & 0 & 0 & \frac{\sqrt{210}}{75} & 0 & -\frac{2\sqrt{105}}{525} & 0 & 0 \\ 0 & -\frac{3\sqrt{70}}{350} & 0 & \frac{\sqrt{210}}{350} & 0 & 0 & \frac{2\sqrt{105}}{525} & 0 & -\frac{\sqrt{210}}{75} & 0 \\ 0 & 0 & \frac{\sqrt{210}}{350} & 0 & 0 & 0 & 0 & -\frac{6\sqrt{35}}{175} & 0 & \frac{\sqrt{14}}{35} \\ -\frac{\sqrt{14}}{35} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{35} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{210}}{75} & 0 & 0 & -\frac{3\sqrt{14}}{35} & 0 & \frac{3\sqrt{35}}{175} & 0 & 0 & 0 \\ \frac{6\sqrt{35}}{175} & 0 & \frac{2\sqrt{105}}{525} & 0 & 0 & \frac{3\sqrt{35}}{175} & 0 & \frac{6\sqrt{70}}{175} & 0 & 0 \\ 0 & -\frac{2\sqrt{105}}{525} & 0 & -\frac{6\sqrt{35}}{175} & 0 & 0 & \frac{6\sqrt{70}}{175} & 0 & \frac{3\sqrt{35}}{175} & 0 \\ 0 & 0 & -\frac{\sqrt{210}}{75} & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}}{175} & 0 & -\frac{3\sqrt{14}}{35} \\ 0 & 0 & 0 & \frac{\sqrt{14}}{35} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{35} & 0 \end{bmatrix}$
526	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{21}}{70} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{14}}{35} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}}{70} & \frac{2\sqrt{105}}{105} & 0 & 0 & 0 & -\frac{2\sqrt{21}}{105} & 0 \\ -\frac{\sqrt{21}}{70} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{21}}{105} & 0 & 0 & 0 & \frac{2\sqrt{105}}{105} \\ 0 & \frac{\sqrt{21}}{70} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{14}}{35} & 0 & 0 & 0 \\ 0 & \frac{2\sqrt{105}}{105} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{70} & 0 & 0 & 0 \\ 0 & 0 & -\frac{2\sqrt{21}}{105} & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}}{70} & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{14}}{35} & \frac{3\sqrt{70}}{70} & 0 & 0 & 0 & -\frac{3\sqrt{14}}{70} & 0 \\ -\frac{2\sqrt{14}}{35} & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}}{70} & 0 & 0 & 0 & -\frac{3\sqrt{70}}{70} \\ 0 & -\frac{2\sqrt{21}}{105} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{70} & 0 & 0 & 0 \\ 0 & 0 & \frac{2\sqrt{105}}{105} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}}{70} & 0 & 0 \end{bmatrix}$
527	symmetry	$\sqrt{15}xyz$
	$\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{21}i}{70} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{14}i}{35} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}i}{70} & -\frac{2\sqrt{105}i}{105} & 0 & 0 & 0 & -\frac{2\sqrt{21}i}{105} & 0 \\ \frac{\sqrt{21}i}{70} & 0 & 0 & 0 & 0 & \frac{2\sqrt{21}i}{105} & 0 & 0 & 0 & \frac{2\sqrt{105}i}{105} \\ 0 & -\frac{\sqrt{21}i}{70} & 0 & 0 & 0 & 0 & \frac{2\sqrt{14}i}{35} & 0 & 0 & 0 \\ 0 & \frac{2\sqrt{105}i}{105} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}i}{70} & 0 & 0 & 0 \\ 0 & 0 & -\frac{2\sqrt{21}i}{105} & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}i}{70} & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{14}i}{35} & -\frac{3\sqrt{70}i}{70} & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{70} & 0 \\ \frac{2\sqrt{14}i}{35} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{70} & 0 & 0 & 0 & -\frac{3\sqrt{70}i}{70} \\ 0 & \frac{2\sqrt{21}i}{105} & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}i}{70} & 0 & 0 & 0 \\ 0 & 0 & -\frac{2\sqrt{105}i}{105} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}i}{70} & 0 & 0 \end{bmatrix}$
528	symmetry	$-\frac{\sqrt{70}x\left(x^2-3y^2\right)\left(x^2+y^2-8z^2\right)}{16}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_5^{(1,-1;a)}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{3} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{3} \\ 0 & 0 & 0 & 0 & \frac{1}{3} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{3} & 0 & 0 & 0 \end{bmatrix}$
529	symmetry	$\frac{z\left(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4\right)}{8}$
	$\mathbb{M}_5^{(1,-1;a)}(A_2,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{42} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}}{42} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}}{21} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{42} \end{bmatrix}$
530	symmetry	$-\frac{\sqrt{70}y\left(3x^2-y^2\right)\left(x^2+y^2-8z^2\right)}{16}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_5^{(1,-1;a)}(A_2,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{3} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{3} \\ 0 & 0 & 0 & 0 & \frac{i}{3} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{3} & 0 & 0 & 0 \end{bmatrix}$
531	symmetry	$\frac{3\sqrt{14}y\left(5x^4-10x^2y^2+y^4\right)}{16}$
	$\mathbb{M}_{5,1}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{2} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
532	symmetry	$\frac{3\sqrt{14}x\left(x^4-10x^2y^2+5y^4\right)}{16}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_{5,2}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{2} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
533	symmetry	$-\frac{\sqrt{15}y\left(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4\right)}{8}$
	$\mathbb{M}_{5,1}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & -\frac{\sqrt{210}i}{42} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{42} & 0 & \frac{\sqrt{105}i}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{21} & 0 & -\frac{\sqrt{210}i}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{42} & 0 & \frac{\sqrt{21}i}{42} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 \end{bmatrix}$
534	symmetry	$\frac{\sqrt{15}x\left(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4\right)}{8}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_{5,2}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & -\frac{\sqrt{210}}{42} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{42} & 0 & \frac{\sqrt{105}}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{21} & 0 & -\frac{\sqrt{210}}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{42} & 0 & \frac{\sqrt{21}}{42} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 \end{bmatrix}$
535	symmetry	$-\frac{3\sqrt{35}z\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$
	$\mathbb{M}_{5,1}^{(1,-1;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 \end{bmatrix}$
536	symmetry	$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_{5,2}^{(1,-1;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{i}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 \end{bmatrix}$
537	symmetry	$\frac{\sqrt{105}z(x-y)(x+y)\left(x^2+y^2-2z^2\right)}{4}$
	$\mathbb{M}_{5,1}^{(1,-1;a)}(E,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & -\frac{\sqrt{30}}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{12} & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 \end{bmatrix}$
538	symmetry	$-\frac{\sqrt{105}xyz\left(x^2+y^2-2z^2\right)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_{5,2}^{(1,-1;a)}(E,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{12} & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 \end{bmatrix}$
539	symmetry	z
	$\mathbb{M}_{1}^{(1,1;a)}(A_2)$	$\begin{bmatrix} \frac{3\sqrt{70}}{50} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{50} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{70}}{50} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{50} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{70}}{50} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{50} & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{70}}{50} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{50} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{35} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{70}}{50} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}}{175} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}}{50} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{175} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{105}}{50} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{175} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{70}}{50} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{175} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{35} \end{bmatrix}$
540	symmetry	$-y$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_{1,1}^{(1,1;a)}(E)$	$\begin{bmatrix} 0 & \frac{\sqrt{210}i}{50} & 0 & 0 & -\frac{\sqrt{14}i}{20} & 0 & -\frac{\sqrt{35}i}{100} & 0 & 0 & 0 \\ -\frac{\sqrt{210}i}{50} & 0 & \frac{\sqrt{70}i}{25} & 0 & 0 & -\frac{\sqrt{210}i}{100} & 0 & -\frac{\sqrt{105}i}{100} & 0 & 0 \\ 0 & -\frac{\sqrt{70}i}{25} & 0 & \frac{\sqrt{210}i}{50} & 0 & 0 & -\frac{\sqrt{105}i}{100} & 0 & -\frac{\sqrt{210}i}{100} & 0 \\ 0 & 0 & -\frac{\sqrt{210}i}{50} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{100} & 0 & -\frac{\sqrt{14}i}{20} \\ \frac{\sqrt{14}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{35} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{210}i}{100} & 0 & 0 & \frac{\sqrt{14}i}{35} & 0 & -\frac{4\sqrt{35}i}{175} & 0 & 0 & 0 \\ \frac{\sqrt{35}i}{100} & 0 & \frac{\sqrt{105}i}{100} & 0 & 0 & \frac{4\sqrt{35}i}{175} & 0 & -\frac{3\sqrt{70}i}{175} & 0 & 0 \\ 0 & \frac{\sqrt{105}i}{100} & 0 & \frac{\sqrt{35}i}{100} & 0 & 0 & \frac{3\sqrt{70}i}{175} & 0 & -\frac{4\sqrt{35}i}{175} & 0 \\ 0 & 0 & \frac{\sqrt{210}i}{100} & 0 & 0 & 0 & 0 & \frac{4\sqrt{35}i}{175} & 0 & -\frac{\sqrt{14}i}{35} \\ 0 & 0 & 0 & \frac{\sqrt{14}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{35} & 0 \end{bmatrix}$
541	symmetry	x
	$\mathbb{M}_{1,2}^{(1,1;a)}(E)$	$\begin{bmatrix} 0 & \frac{\sqrt{210}}{50} & 0 & 0 & \frac{\sqrt{14}}{20} & 0 & -\frac{\sqrt{35}}{100} & 0 & 0 & 0 \\ \frac{\sqrt{210}}{50} & 0 & \frac{\sqrt{70}}{25} & 0 & 0 & \frac{\sqrt{210}}{100} & 0 & -\frac{\sqrt{105}}{100} & 0 & 0 \\ 0 & \frac{\sqrt{70}}{25} & 0 & \frac{\sqrt{210}}{50} & 0 & 0 & \frac{\sqrt{105}}{100} & 0 & -\frac{\sqrt{210}}{100} & 0 \\ 0 & 0 & \frac{\sqrt{210}}{50} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{100} & 0 & -\frac{\sqrt{14}}{20} \\ \frac{\sqrt{14}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{35} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{210}}{100} & 0 & 0 & -\frac{\sqrt{14}}{35} & 0 & -\frac{4\sqrt{35}}{175} & 0 & 0 & 0 \\ -\frac{\sqrt{35}}{100} & 0 & \frac{\sqrt{105}}{100} & 0 & 0 & -\frac{4\sqrt{35}}{175} & 0 & -\frac{3\sqrt{70}}{175} & 0 & 0 \\ 0 & -\frac{\sqrt{105}}{100} & 0 & \frac{\sqrt{35}}{100} & 0 & 0 & -\frac{3\sqrt{70}}{175} & 0 & -\frac{4\sqrt{35}}{175} & 0 \\ 0 & 0 & -\frac{\sqrt{210}}{100} & 0 & 0 & 0 & 0 & -\frac{4\sqrt{35}}{175} & 0 & -\frac{\sqrt{14}}{35} \\ 0 & 0 & 0 & -\frac{\sqrt{14}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{35} & 0 \end{bmatrix}$
542	symmetry	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_3^{(1,1;a)}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{6\sqrt{14}}{35} & 0 & 0 & 0 & 0 & \frac{9\sqrt{14}}{280} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{210}}{280} \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{210}}{280} & 0 & 0 & 0 & 0 & 0 \\ -\frac{6\sqrt{14}}{35} & 0 & 0 & 0 & 0 & -\frac{9\sqrt{14}}{280} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{210}}{280} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{105} & 0 & 0 \\ 0 & 0 & 0 & -\frac{9\sqrt{14}}{280} & 0 & 0 & 0 & 0 & \frac{2\sqrt{14}}{105} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{105} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{105} & 0 & 0 & 0 & 0 & 0 \\ \frac{9\sqrt{14}}{280} & 0 & 0 & 0 & 0 & \frac{2\sqrt{14}}{105} & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{210}}{280} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{105} & 0 & 0 & 0 \end{bmatrix}$
543	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{M}_3^{(1,1;a)}(A_2,1)$	$\begin{bmatrix} -\frac{6\sqrt{35}}{175} & 0 & 0 & 0 & 0 & \frac{9\sqrt{35}}{350} & 0 & 0 & 0 & 0 \\ 0 & \frac{18\sqrt{35}}{175} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{210}}{350} & 0 & 0 & 0 \\ 0 & 0 & -\frac{18\sqrt{35}}{175} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{210}}{350} & 0 & 0 \\ 0 & 0 & 0 & \frac{6\sqrt{35}}{175} & 0 & 0 & 0 & 0 & \frac{9\sqrt{35}}{350} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{105} & 0 & 0 & 0 & 0 & 0 \\ \frac{9\sqrt{35}}{350} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{75} & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{210}}{350} & 0 & 0 & 0 & 0 & -\frac{4\sqrt{35}}{525} & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{210}}{350} & 0 & 0 & 0 & 0 & \frac{4\sqrt{35}}{525} & 0 & 0 \\ 0 & 0 & 0 & \frac{9\sqrt{35}}{350} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{75} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{105} \end{bmatrix}$
544	symmetry	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_3^{(1,1;a)}(A_2,2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{6\sqrt{14}i}{35} & 0 & 0 & 0 & 0 & -\frac{9\sqrt{14}i}{280} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{210}i}{280} \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{210}i}{280} & 0 & 0 & 0 & 0 & 0 \\ -\frac{6\sqrt{14}i}{35} & 0 & 0 & 0 & 0 & -\frac{9\sqrt{14}i}{280} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{210}i}{280} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{105} & 0 & 0 \\ 0 & 0 & 0 & \frac{9\sqrt{14}i}{280} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{14}i}{105} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{105} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{105} & 0 & 0 & 0 & 0 & 0 \\ \frac{9\sqrt{14}i}{280} & 0 & 0 & 0 & 0 & \frac{2\sqrt{14}i}{105} & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{210}i}{280} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{105} & 0 & 0 & 0 \end{bmatrix}$
545	$\mathbb{M}_{3,1}^{(1,1;a)}(E,1)$	$\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$ $\begin{bmatrix} 0 & -\frac{6\sqrt{70}i}{175} & 0 & 0 & \frac{3\sqrt{42}i}{280} & 0 & \frac{9\sqrt{105}i}{700} & 0 & 0 & 0 \\ \frac{6\sqrt{70}i}{175} & 0 & \frac{6\sqrt{210}i}{175} & 0 & 0 & -\frac{3\sqrt{70}i}{200} & 0 & -\frac{3\sqrt{35}i}{700} & 0 & 0 \\ 0 & -\frac{6\sqrt{210}i}{175} & 0 & -\frac{6\sqrt{70}i}{175} & 0 & 0 & -\frac{3\sqrt{35}i}{700} & 0 & -\frac{3\sqrt{70}i}{200} & 0 \\ 0 & 0 & \frac{6\sqrt{70}i}{175} & 0 & 0 & 0 & 0 & \frac{9\sqrt{105}i}{700} & 0 & \frac{3\sqrt{42}i}{280} \\ -\frac{3\sqrt{42}i}{280} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{105} & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{70}i}{200} & 0 & 0 & -\frac{\sqrt{42}i}{105} & 0 & -\frac{\sqrt{105}i}{525} & 0 & 0 & 0 \\ -\frac{9\sqrt{105}i}{700} & 0 & \frac{3\sqrt{35}i}{700} & 0 & 0 & \frac{\sqrt{105}i}{525} & 0 & -\frac{2\sqrt{210}i}{525} & 0 & 0 \\ 0 & \frac{3\sqrt{35}i}{700} & 0 & -\frac{9\sqrt{105}i}{700} & 0 & 0 & \frac{2\sqrt{210}i}{525} & 0 & -\frac{\sqrt{105}i}{525} & 0 \\ 0 & 0 & \frac{3\sqrt{70}i}{200} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{525} & 0 & \frac{\sqrt{42}i}{105} \\ 0 & 0 & 0 & -\frac{3\sqrt{42}i}{280} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{105} & 0 \end{bmatrix}$
546	symmetry	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_{3,2}^{(1,1;a)}(E,1)$	$\begin{bmatrix} 0 & -\frac{6\sqrt{70}}{175} & 0 & 0 & -\frac{3\sqrt{42}}{280} & 0 & \frac{9\sqrt{105}}{700} & 0 & 0 & 0 \\ -\frac{6\sqrt{70}}{175} & 0 & \frac{6\sqrt{210}}{175} & 0 & 0 & \frac{3\sqrt{70}}{200} & 0 & -\frac{3\sqrt{35}}{700} & 0 & 0 \\ 0 & \frac{6\sqrt{210}}{175} & 0 & -\frac{6\sqrt{70}}{175} & 0 & 0 & \frac{3\sqrt{35}}{700} & 0 & -\frac{3\sqrt{70}}{200} & 0 \\ 0 & 0 & -\frac{6\sqrt{70}}{175} & 0 & 0 & 0 & 0 & -\frac{9\sqrt{105}}{700} & 0 & \frac{3\sqrt{42}}{280} \\ -\frac{3\sqrt{42}}{280} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{105} & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{70}}{200} & 0 & 0 & \frac{\sqrt{42}}{105} & 0 & -\frac{\sqrt{105}}{525} & 0 & 0 & 0 \\ \frac{9\sqrt{105}}{700} & 0 & \frac{3\sqrt{35}}{700} & 0 & 0 & -\frac{\sqrt{105}}{525} & 0 & -\frac{2\sqrt{210}}{525} & 0 & 0 \\ 0 & -\frac{3\sqrt{35}}{700} & 0 & -\frac{9\sqrt{105}}{700} & 0 & 0 & -\frac{2\sqrt{210}}{525} & 0 & -\frac{\sqrt{105}}{525} & 0 \\ 0 & 0 & -\frac{3\sqrt{70}}{200} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{525} & 0 & \frac{\sqrt{42}}{105} \\ 0 & 0 & 0 & \frac{3\sqrt{42}}{280} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{105} & 0 \end{bmatrix}$
547	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{M}_{3,1}^{(1,1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & \frac{6\sqrt{7}}{35} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{42}}{140} & 0 & 0 \\ 0 & 0 & 0 & -\frac{6\sqrt{7}}{35} & \frac{3\sqrt{35}}{140} & 0 & 0 & 0 & -\frac{3\sqrt{7}}{140} & 0 \\ \frac{6\sqrt{7}}{35} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{140} & 0 & 0 & 0 & \frac{3\sqrt{35}}{140} \\ 0 & -\frac{6\sqrt{7}}{35} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{42}}{140} & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{35}}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{210} & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{7}}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{210} & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{42}}{140} & -\frac{\sqrt{210}}{210} & 0 & 0 & 0 & \frac{\sqrt{42}}{210} & 0 \\ -\frac{3\sqrt{42}}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{210} & 0 & 0 & 0 & \frac{\sqrt{210}}{210} \\ 0 & -\frac{3\sqrt{7}}{140} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{210} & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{35}}{140} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{210} & 0 & 0 \end{bmatrix}$
548	symmetry	$\sqrt{15}xyz$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_{3,2}^{(1,1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & \frac{6\sqrt{7}i}{35} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{42}i}{140} & 0 & 0 \\ 0 & 0 & 0 & -\frac{6\sqrt{7}i}{35} & -\frac{3\sqrt{35}i}{140} & 0 & 0 & 0 & -\frac{3\sqrt{7}i}{140} & 0 \\ -\frac{6\sqrt{7}i}{35} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{140} & 0 & 0 & 0 & \frac{3\sqrt{35}i}{140} \\ 0 & \frac{6\sqrt{7}i}{35} & 0 & 0 & 0 & 0 & \frac{3\sqrt{42}i}{140} & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{35}i}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{210} & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{7}i}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{210} & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{42}i}{140} & \frac{\sqrt{210}i}{210} & 0 & 0 & 0 & \frac{\sqrt{42}i}{210} & 0 \\ \frac{3\sqrt{42}i}{140} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{210} & 0 & 0 & 0 & \frac{\sqrt{210}i}{210} \\ 0 & \frac{3\sqrt{7}i}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{210} & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{35}i}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{210} & 0 & 0 \end{bmatrix}$

bra: $= \langle \frac{3}{2}, \frac{3}{2}; d|\,, \langle \frac{3}{2}, \frac{1}{2}; d|\,, \langle \frac{3}{2}, -\frac{1}{2}; d|\,, \langle \frac{3}{2}, -\frac{3}{2}; d|\,, \langle \frac{5}{2}, \frac{5}{2}; d|\,, \langle \frac{5}{2}, \frac{3}{2}; d|\,, \langle \frac{5}{2}, \frac{1}{2}; d|\,, \langle \frac{5}{2}, -\frac{1}{2}; d|\,, \langle \frac{5}{2}, -\frac{3}{2}; d|\,, \langle \frac{5}{2}, -\frac{5}{2}; d|$

ket: $= |\frac{5}{2}, \frac{5}{2}; f\rangle\,, |\frac{5}{2}, \frac{3}{2}; f\rangle\,, |\frac{5}{2}, \frac{1}{2}; f\rangle\,, |\frac{5}{2}, -\frac{1}{2}; f\rangle\,, |\frac{5}{2}, -\frac{3}{2}; f\rangle\,, |\frac{5}{2}, -\frac{5}{2}; f\rangle\,, |\frac{7}{2}, \frac{7}{2}; f\rangle\,, |\frac{7}{2}, \frac{5}{2}; f\rangle\,, |\frac{7}{2}, \frac{3}{2}; f\rangle\,, |\frac{7}{2}, \frac{1}{2}; f\rangle\,, |\frac{7}{2}, -\frac{1}{2}; f\rangle\,, |\frac{7}{2}, -\frac{3}{2}; f\rangle\,, |\frac{7}{2}, -\frac{5}{2}; f\rangle\,, |\frac{7}{2}, -\frac{7}{2}; f\rangle$

Table 9: (d,f) block.

No.	multipole	matrix
549	symmetry	z
	$\mathbb{Q}_1^{(a)}(A_1)$	$\begin{bmatrix} 0 & \frac{1}{5} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{1}{5} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{1}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{1}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{7} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{7} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{14} & 0 \end{bmatrix}$

continued ...

Table 9

No.	multipole	matrix
550	symmetry	x
	$\mathbb{Q}_{1,1}^{(a)}(E)$	$\begin{bmatrix} -\frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{2}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{10} & 0 & \frac{\sqrt{6}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{20} & 0 & \frac{\sqrt{3}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{20} & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 & \frac{\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}}{70} & 0 & -\frac{\sqrt{2}}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{28} & 0 & \frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{35} & 0 & -\frac{3}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{14} & 0 & \frac{\sqrt{3}}{14} & 0 & 0 & 0 \\ 0 & 0 & -\frac{3}{70} & 0 & -\frac{\sqrt{2}}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{14} & 0 & \frac{\sqrt{5}}{14} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{35} & 0 & -\frac{\sqrt{5}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & \frac{\sqrt{30}}{28} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{28} & 0 & \frac{\sqrt{42}}{28} \end{bmatrix}$
551	symmetry	y
	$\mathbb{Q}_{1,2}^{(a)}(E)$	$\begin{bmatrix} -\frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{10} & 0 & -\frac{\sqrt{6}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{20} & 0 & -\frac{\sqrt{3}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{20} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & -\frac{\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}i}{70} & 0 & \frac{\sqrt{2}i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{28} & 0 & -\frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{35} & 0 & \frac{3i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{14} & 0 & -\frac{\sqrt{3}i}{14} & 0 & 0 & 0 \\ 0 & 0 & -\frac{3i}{70} & 0 & \frac{\sqrt{2}i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{14} & 0 & -\frac{\sqrt{5}i}{14} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{35} & 0 & \frac{\sqrt{5}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{28} & 0 & -\frac{\sqrt{30}i}{28} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{28} & 0 & -\frac{\sqrt{42}i}{28} \end{bmatrix}$
552	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_3^{(a)}(A_1,1)$	$\begin{bmatrix} 0 & -\frac{3\sqrt{21}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{14}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{14}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{21}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 \\ \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{2\sqrt{21}}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{2\sqrt{21}}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 \end{bmatrix}$
553	symmetry	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$
	$\mathbb{Q}_3^{(a)}(A_1,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{3\sqrt{210}i}{280} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}i}{56} & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 \\ \frac{3\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} \\ 0 & \frac{3\sqrt{210}i}{280} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}i}{56} & 0 \\ \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} \\ 0 & \frac{\sqrt{210}i}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 \end{bmatrix}$
554	symmetry	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_3^{(a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{3\sqrt{210}}{280} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{56} & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 \\ \frac{3\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} \\ 0 & \frac{3\sqrt{210}}{280} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{105} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{56} & 0 \\ \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} \\ 0 & \frac{\sqrt{210}}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 \end{bmatrix}$
555	symmetry	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{Q}_{3,1}^{(a)}(E,1)$	$\begin{bmatrix} \frac{3\sqrt{70}}{280} & 0 & -\frac{9\sqrt{7}}{140} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}}{40} & 0 & \frac{\sqrt{21}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{21}}{140} & 0 & \frac{\sqrt{42}}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{9\sqrt{7}}{140} & 0 & -\frac{3\sqrt{70}}{280} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & \frac{\sqrt{105}}{84} & 0 \\ 0 & \frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{70}}{70} & 0 & -\frac{\sqrt{7}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}}{70} & 0 & -\frac{\sqrt{14}}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{42}}{168} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{14}}{35} & 0 & -\frac{\sqrt{7}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{168} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{70} & 0 & \frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & \frac{\sqrt{105}}{84} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{3}}{12} \end{bmatrix}$
556	symmetry	$-\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_{3,2}^{(a)}(E,1)$	$\begin{bmatrix} \frac{3\sqrt{70}i}{280} & 0 & \frac{9\sqrt{7}i}{140} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}i}{40} & 0 & -\frac{\sqrt{21}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{21}i}{140} & 0 & -\frac{\sqrt{42}i}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{9\sqrt{7}i}{140} & 0 & \frac{3\sqrt{70}i}{280} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & -\frac{\sqrt{105}i}{84} & 0 \\ 0 & -\frac{\sqrt{70}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{70}i}{70} & 0 & \frac{\sqrt{7}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}i}{70} & 0 & \frac{\sqrt{14}i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & -\frac{\sqrt{42}i}{168} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{14}i}{35} & 0 & \frac{\sqrt{7}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{168} & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}i}{70} & 0 & -\frac{\sqrt{70}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & -\frac{\sqrt{105}i}{84} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{3}i}{12} \end{bmatrix}$
557	symmetry	$\sqrt{15}xyz$
	$\mathbb{Q}_{3,1}^{(a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{3\sqrt{70}i}{140} & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & 0 \\ \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & \frac{\sqrt{105}i}{140} & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 \\ 0 & -\frac{\sqrt{105}i}{140} & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 \\ 0 & 0 & -\frac{3\sqrt{70}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} \\ 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{70}i}{140} & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & 0 \\ \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & \frac{\sqrt{70}i}{140} & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 \\ 0 & \frac{\sqrt{70}i}{140} & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 \\ 0 & 0 & -\frac{\sqrt{70}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{42} & 0 & 0 & 0 \end{bmatrix}$
558	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_{3,2}^{(a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{3\sqrt{70}}{140} & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 \\ \frac{\sqrt{21}}{28} & 0 & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 \\ 0 & -\frac{\sqrt{105}}{140} & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 \\ 0 & 0 & -\frac{3\sqrt{70}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & 0 & \frac{\sqrt{6}}{24} \\ 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{70}}{140} & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 \\ \frac{\sqrt{14}}{28} & 0 & 0 & 0 & -\frac{\sqrt{70}}{140} & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 \\ 0 & \frac{\sqrt{70}}{140} & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & 0 \\ 0 & 0 & -\frac{\sqrt{70}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & 0 \end{bmatrix}$
559	symmetry	$\frac{z\left(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4\right)}{8}$
	$\mathbb{Q}_5^{(a)}(A_1,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 \\ -\frac{\sqrt{6}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{6}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{15}}{70} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{6}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{6}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{15}}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{14} & 0 \end{bmatrix}$
560	symmetry	$-\frac{\sqrt{70}y\left(3x^2-y^2\right)\left(x^2+y^2-8z^2\right)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_5^{(a)}(A_1,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{30} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{30} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{30} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{30} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{30} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{30} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{42} & -\frac{i}{10} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{70} & 0 \\ -\frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{70} & 0 & 0 & 0 & 0 & 0 & -\frac{i}{10} \\ 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 \end{bmatrix}$
561	symmetry	$-\frac{\sqrt{70}x\left(x^2-3y^2\right)\left(x^2+y^2-8z^2\right)}{16}$
	$\mathbb{Q}_5^{(a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{30} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{30} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{30} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{30} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{30} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{30} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & -\frac{1}{10} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{70} & 0 \\ -\frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{70} & 0 & 0 & 0 & 0 & 0 & \frac{1}{10} \\ 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 \end{bmatrix}$
562	symmetry	$\frac{3\sqrt{14}x\left(x^4-10x^2y^2+5y^4\right)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_{5,1}^{(a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
563	symmetry	$-\frac{3\sqrt{14}y\left(5x^4-10x^2y^2+y^4\right)}{16}$
	$\mathbb{Q}_{5,2}^{(a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
564	symmetry	$\frac{\sqrt{15}x\left(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4\right)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_{5,1}^{(a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{30} & 0 & \frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{3}}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{30} & 0 & -\frac{\sqrt{3}}{30} & 0 \\ 0 & -\frac{\sqrt{2}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{420} & 0 & \frac{\sqrt{5}}{28} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{28} & 0 & \frac{\sqrt{5}}{14} & 0 & 0 & 0 & 0 & \frac{23\sqrt{3}}{420} & 0 & -\frac{13\sqrt{15}}{420} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{14} & 0 & -\frac{\sqrt{10}}{14} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{2}}{140} & 0 & \frac{\sqrt{30}}{420} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}}{14} & 0 & \frac{\sqrt{5}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{420} & 0 & \frac{11\sqrt{2}}{140} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{14} & 0 & -\frac{\sqrt{2}}{28} & 0 & 0 & 0 & 0 & \frac{13\sqrt{15}}{420} & 0 & -\frac{23\sqrt{3}}{420} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{28} & 0 & \frac{\sqrt{105}}{420} \end{bmatrix}$
565	symmetry	$\frac{\sqrt{15}y\left(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4\right)}{8}$
	$\mathbb{Q}_{5,2}^{(a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{30} & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{10} & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{3}i}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{30} & 0 & \frac{\sqrt{3}i}{30} & 0 \\ 0 & \frac{\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{420} & 0 & -\frac{\sqrt{5}i}{28} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{28} & 0 & -\frac{\sqrt{5}i}{14} & 0 & 0 & 0 & 0 & \frac{23\sqrt{3}i}{420} & 0 & \frac{13\sqrt{15}i}{420} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}i}{14} & 0 & \frac{\sqrt{10}i}{14} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{2}i}{140} & 0 & -\frac{\sqrt{30}i}{420} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{14} & 0 & -\frac{\sqrt{5}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{420} & 0 & -\frac{11\sqrt{2}i}{140} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{14} & 0 & \frac{\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & \frac{13\sqrt{15}i}{420} & 0 & \frac{23\sqrt{3}i}{420} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{28} & 0 & -\frac{\sqrt{105}i}{420} \end{bmatrix}$
566	symmetry	$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_{5,1}^{(a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{70} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
567	symmetry	$\frac{3\sqrt{35}z\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$
	$\mathbb{Q}_{5,2}^{(a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{70} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
568	symmetry	$-\frac{\sqrt{105}xyz\left(x^2+y^2-2z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_{5,1}^{(a)}(E,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{60} & 0 & 0 & 0 & -\frac{\sqrt{105}i}{60} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{20} & 0 & 0 & 0 & \frac{\sqrt{21}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{20} & 0 & 0 & 0 & -\frac{\sqrt{7}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{60} & 0 & 0 & 0 & \frac{\sqrt{3}i}{60} \\ 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & -\frac{\sqrt{3}i}{30} & 0 & 0 & 0 & \frac{\sqrt{105}i}{105} & 0 & 0 & 0 \\ -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & \frac{2\sqrt{42}i}{105} & 0 & 0 & 0 & \frac{\sqrt{14}i}{70} & 0 & 0 \\ 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{14}i}{70} & 0 & 0 & 0 & -\frac{2\sqrt{42}i}{105} & 0 \\ 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{105} & 0 & 0 & 0 & \frac{\sqrt{3}i}{30} \\ 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 \end{bmatrix}$
569	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)\left(x^2+y^2-2z^2\right)}{4}$
	$\mathbb{Q}_{5,2}^{(a)}(E,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{60} & 0 & 0 & 0 & \frac{\sqrt{105}}{60} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{20} & 0 & 0 & 0 & -\frac{\sqrt{21}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{20} & 0 & 0 & 0 & \frac{\sqrt{7}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{60} & 0 & 0 & 0 & -\frac{\sqrt{3}}{60} \\ 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & -\frac{\sqrt{3}}{30} & 0 & 0 & 0 & -\frac{\sqrt{105}}{105} & 0 & 0 & 0 \\ -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & \frac{2\sqrt{42}}{105} & 0 & 0 & 0 & -\frac{\sqrt{14}}{70} & 0 & 0 \\ 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{14}}{70} & 0 & 0 & 0 & \frac{2\sqrt{42}}{105} & 0 \\ 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{105} & 0 & 0 & 0 & -\frac{\sqrt{3}}{30} \\ 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 \end{bmatrix}$
570	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_3^{(1,-1;a)}(A_1,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{6}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{2}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{2}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{14} & 0 & 0 \\ \frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2}{7} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{7} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{7} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2}{7} & 0 \end{bmatrix}$
571	symmetry	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$
	$\mathbb{Q}_3^{(1,-1;a)}(A_1,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{14} & -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{14} & 0 \\ \frac{i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} \\ 0 & \frac{\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{28} & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{3i}{14} & 0 \\ \frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3i}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} \\ 0 & \frac{\sqrt{15}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{14} & 0 & 0 & 0 & 0 \end{bmatrix}$
572	symmetry	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_3^{(1,-1;a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{1}{14} & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{14} & 0 \\ \frac{1}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} \\ 0 & \frac{\sqrt{15}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{28} & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & \frac{3}{14} & 0 \\ \frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} \\ 0 & \frac{\sqrt{15}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{14} & 0 & 0 & 0 & 0 \end{bmatrix}$
573	symmetry	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{Q}_{3,1}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} \frac{\sqrt{5}}{70} & 0 & -\frac{3\sqrt{2}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{28} & 0 & -\frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{30} & 0 & \frac{\sqrt{6}}{210} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{210} & 0 & \frac{\sqrt{3}}{30} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{2}}{70} & 0 & -\frac{\sqrt{5}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{14} & 0 & \frac{\sqrt{30}}{28} & 0 \\ 0 & \frac{3\sqrt{5}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & \frac{\sqrt{2}}{7} & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{5}}{70} & 0 & -\frac{3\sqrt{2}}{140} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{42} & 0 & \frac{\sqrt{6}}{21} & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{2}}{140} & 0 & -\frac{3}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{14} & 0 & -\frac{\sqrt{3}}{42} & 0 & 0 & 0 \\ 0 & 0 & -\frac{3}{35} & 0 & -\frac{3\sqrt{2}}{140} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{42} & 0 & -\frac{\sqrt{5}}{14} & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{2}}{140} & 0 & \frac{3\sqrt{5}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{21} & 0 & -\frac{\sqrt{30}}{42} & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{5}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{7} & 0 & \frac{\sqrt{42}}{42} \end{bmatrix}$
574	symmetry	$-\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_{3,2}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} \frac{\sqrt{5}i}{70} & 0 & \frac{3\sqrt{2}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{28} & 0 & \frac{\sqrt{6}i}{14} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{30} & 0 & -\frac{\sqrt{6}i}{210} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{210} & 0 & -\frac{\sqrt{3}i}{30} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{2}i}{70} & 0 & \frac{\sqrt{5}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{14} & 0 & -\frac{\sqrt{30}i}{28} & 0 \\ 0 & -\frac{3\sqrt{5}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{42} & 0 & -\frac{\sqrt{2}i}{7} & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{5}i}{70} & 0 & \frac{3\sqrt{2}i}{140} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{42} & 0 & -\frac{\sqrt{6}i}{21} & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{2}i}{140} & 0 & \frac{3i}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{14} & 0 & \frac{\sqrt{3}i}{42} & 0 & 0 & 0 \\ 0 & 0 & -\frac{3i}{35} & 0 & \frac{3\sqrt{2}i}{140} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{42} & 0 & \frac{\sqrt{5}i}{14} & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{2}i}{140} & 0 & -\frac{3\sqrt{5}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{21} & 0 & \frac{\sqrt{30}i}{42} & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{5}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{7} & 0 & -\frac{\sqrt{42}i}{42} \end{bmatrix}$
575	symmetry	$\sqrt{15}xyz$
	$\mathbb{Q}_{3,1}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{5}i}{35} & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & \frac{\sqrt{15}i}{28} & 0 & 0 & 0 \\ \frac{\sqrt{6}i}{42} & 0 & 0 & 0 & \frac{\sqrt{30}i}{210} & 0 & 0 & \frac{3i}{28} & 0 & 0 & 0 & \frac{3\sqrt{3}i}{28} & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{210} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{42} & 0 & 0 & \frac{3\sqrt{3}i}{28} & 0 & 0 & 0 & \frac{3i}{28} & 0 \\ 0 & 0 & -\frac{\sqrt{5}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} \\ 0 & 0 & -\frac{3i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{3}i}{21} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{5}i}{140} & 0 & 0 & -\frac{\sqrt{21}i}{21} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{21} & 0 & 0 & 0 \\ \frac{3i}{28} & 0 & 0 & 0 & \frac{3\sqrt{5}i}{140} & 0 & 0 & -\frac{\sqrt{6}i}{42} & 0 & 0 & 0 & -\frac{\sqrt{2}i}{14} & 0 & 0 \\ 0 & \frac{3\sqrt{5}i}{140} & 0 & 0 & 0 & \frac{3i}{28} & 0 & 0 & \frac{\sqrt{2}i}{14} & 0 & 0 & 0 & \frac{\sqrt{6}i}{42} & 0 \\ 0 & 0 & -\frac{3\sqrt{5}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{21} & 0 & 0 & 0 & \frac{\sqrt{21}i}{21} \\ 0 & 0 & 0 & -\frac{3i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{3}i}{21} & 0 & 0 & 0 \end{bmatrix}$
576	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_{3,2}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{5}}{35} & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & -\frac{\sqrt{15}}{28} & 0 & 0 & 0 \\ \frac{\sqrt{6}}{42} & 0 & 0 & 0 & -\frac{\sqrt{30}}{210} & 0 & 0 & \frac{3}{28} & 0 & 0 & 0 & -\frac{3\sqrt{3}}{28} & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{210} & 0 & 0 & 0 & \frac{\sqrt{6}}{42} & 0 & 0 & \frac{3\sqrt{3}}{28} & 0 & 0 & 0 & -\frac{3}{28} & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{28} & 0 & 0 & 0 & \frac{\sqrt{21}}{28} \\ 0 & 0 & \frac{3}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{3}}{21} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{5}}{140} & 0 & 0 & -\frac{\sqrt{21}}{21} & 0 & 0 & 0 & \frac{\sqrt{15}}{21} & 0 & 0 & 0 \\ \frac{3}{28} & 0 & 0 & 0 & -\frac{3\sqrt{5}}{140} & 0 & 0 & -\frac{\sqrt{6}}{42} & 0 & 0 & 0 & \frac{\sqrt{2}}{14} & 0 & 0 \\ 0 & \frac{3\sqrt{5}}{140} & 0 & 0 & 0 & -\frac{3}{28} & 0 & 0 & \frac{\sqrt{2}}{14} & 0 & 0 & 0 & -\frac{\sqrt{6}}{42} & 0 \\ 0 & 0 & -\frac{3\sqrt{5}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{21} & 0 & 0 & 0 & -\frac{\sqrt{21}}{21} \\ 0 & 0 & 0 & -\frac{3}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{3}}{21} & 0 & 0 & 0 \end{bmatrix}$
577	symmetry	$\frac{z\left(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4\right)}{8}$
	$\mathbb{Q}_{5}^{(1,-1;a)}(A_1,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{20} & 0 & 0 \\ -\frac{\sqrt{5}}{210} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{35} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{2}}{35} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}}{35} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}}{35} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{2}}{35} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{210} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{35} & 0 \end{bmatrix}$
578	symmetry	$-\frac{\sqrt{70}y\left(3x^2-y^2\right)\left(x^2+y^2-8z^2\right)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_5^{(1,-1;a)}(A_1,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{50} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{50} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{50} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{50} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{50} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{50} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{35}i}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{35} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}i}{175} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{105} & \frac{\sqrt{30}i}{25} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{210}i}{175} & 0 \\ -\frac{\sqrt{35}i}{105} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{210}i}{175} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{25} \\ 0 & \frac{\sqrt{14}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}i}{175} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{35}i}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{35} & 0 & 0 & 0 & 0 \end{bmatrix}$
579	symmetry	$-\frac{\sqrt{70}x\left(x^2-3y^2\right)\left(x^2+y^2-8z^2\right)}{16}$
	$\mathbb{Q}_5^{(1,-1;a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{50} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{50} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{50} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{50} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{50} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{50} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}}{105} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{35} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}}{175} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{105} & \frac{\sqrt{30}}{25} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{210}}{175} & 0 \\ -\frac{\sqrt{35}}{105} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{210}}{175} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{25} \\ 0 & \frac{\sqrt{14}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}}{175} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{35}}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{35} & 0 & 0 & 0 & 0 \end{bmatrix}$
580	symmetry	$\frac{3\sqrt{14}x\left(x^4-10x^2y^2+5y^4\right)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_{5,1}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{35} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{5} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{5} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{35} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
581	symmetry	$-\frac{3\sqrt{14}y\left(5x^4-10x^2y^2+y^4\right)}{16}$
	$\mathbb{Q}_{5,2}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{35} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{5} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{5} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{70}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
582	symmetry	$\frac{\sqrt{15}x\left(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4\right)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_{5,1}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{100} & 0 & \frac{\sqrt{2}}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{100} & 0 & -\frac{\sqrt{6}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{20} & 0 & \frac{3\sqrt{10}}{100} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{20} & 0 & -\frac{\sqrt{10}}{100} & 0 \\ 0 & -\frac{\sqrt{15}}{210} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{70} & 0 & -\frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}}{210} & 0 & \frac{\sqrt{6}}{42} & 0 & 0 & 0 & 0 & -\frac{23\sqrt{10}}{350} & 0 & \frac{13\sqrt{2}}{70} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{42} & 0 & -\frac{\sqrt{3}}{21} & 0 & 0 & 0 & 0 & \frac{11\sqrt{15}}{175} & 0 & -\frac{1}{35} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{21} & 0 & \frac{\sqrt{6}}{42} & 0 & 0 & 0 & 0 & \frac{1}{35} & 0 & -\frac{11\sqrt{15}}{175} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{42} & 0 & -\frac{\sqrt{15}}{210} & 0 & 0 & 0 & 0 & -\frac{13\sqrt{2}}{70} & 0 & \frac{23\sqrt{10}}{350} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{210} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{14} & 0 & -\frac{\sqrt{14}}{70} \end{bmatrix}$
583	symmetry	$\frac{\sqrt{15}y\left(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4\right)}{8}$
	$\mathbb{Q}_{5,2}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{100} & 0 & -\frac{\sqrt{2}i}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}i}{100} & 0 & \frac{\sqrt{6}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{20} & 0 & -\frac{3\sqrt{10}i}{100} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{20} & 0 & \frac{\sqrt{10}i}{100} & 0 \\ 0 & \frac{\sqrt{15}i}{210} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{70} & 0 & \frac{\sqrt{6}i}{14} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}i}{210} & 0 & -\frac{\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & -\frac{23\sqrt{10}i}{350} & 0 & -\frac{13\sqrt{2}i}{70} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{42} & 0 & \frac{\sqrt{3}i}{21} & 0 & 0 & 0 & 0 & \frac{11\sqrt{15}i}{175} & 0 & \frac{i}{35} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{21} & 0 & -\frac{\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & \frac{i}{35} & 0 & \frac{11\sqrt{15}i}{175} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{42} & 0 & \frac{\sqrt{15}i}{210} & 0 & 0 & 0 & 0 & -\frac{13\sqrt{2}i}{70} & 0 & -\frac{23\sqrt{10}i}{350} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{210} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{14} & 0 & \frac{\sqrt{14}i}{70} \end{bmatrix}$
584	symmetry	$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_{5,1}^{(1,-1;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{100} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{100} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{100} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{100} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{35} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{175} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{15}i}{25} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}i}{25} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{175} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}i}{35} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
585	symmetry	$\frac{3\sqrt{35}z\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$
	$\mathbb{Q}_{5,2}^{(1,-1;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{100} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{100} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{100} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{100} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{35} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{175} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{15}}{25} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{15}}{25} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{175} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{35} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
586	symmetry	$-\frac{\sqrt{105}xyz\left(x^2+y^2-2z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_{5,1}^{(1,-1;a)}(E,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{200} & 0 & 0 & 0 & -\frac{\sqrt{14}i}{40} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{200} & 0 & 0 & 0 & \frac{3\sqrt{70}i}{200} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}i}{200} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{200} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{40} & 0 & 0 & 0 & \frac{\sqrt{10}i}{200} \\ 0 & 0 & \frac{\sqrt{210}i}{420} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{35} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & \frac{\sqrt{10}i}{25} & 0 & 0 & 0 & -\frac{2\sqrt{14}i}{35} & 0 & 0 & 0 \\ -\frac{\sqrt{210}i}{420} & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & -\frac{8\sqrt{35}i}{175} & 0 & 0 & 0 & -\frac{2\sqrt{105}i}{175} & 0 & 0 \\ 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{420} & 0 & 0 & \frac{2\sqrt{105}i}{175} & 0 & 0 & 0 & \frac{8\sqrt{35}i}{175} & 0 \\ 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{14}i}{35} & 0 & 0 & 0 & -\frac{\sqrt{10}i}{25} \\ 0 & 0 & 0 & \frac{\sqrt{210}i}{420} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{35} & 0 & 0 & 0 \end{bmatrix}$
587	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)\left(x^2+y^2-2z^2\right)}{4}$
	$\mathbb{Q}_{5,2}^{(1,-1;a)}(E,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{200} & 0 & 0 & 0 & \frac{\sqrt{14}}{40} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{200} & 0 & 0 & 0 & -\frac{3\sqrt{70}}{200} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{200} & 0 & 0 & 0 & \frac{\sqrt{210}}{200} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{40} & 0 & 0 & 0 & -\frac{\sqrt{10}}{200} \\ 0 & 0 & -\frac{\sqrt{210}}{420} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{35} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & \frac{\sqrt{10}}{25} & 0 & 0 & 0 & \frac{2\sqrt{14}}{35} & 0 & 0 & 0 \\ -\frac{\sqrt{210}}{420} & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & -\frac{8\sqrt{35}}{175} & 0 & 0 & 0 & \frac{2\sqrt{105}}{175} & 0 & 0 \\ 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 & \frac{\sqrt{210}}{420} & 0 & 0 & \frac{2\sqrt{105}}{175} & 0 & 0 & 0 & -\frac{8\sqrt{35}}{175} & 0 \\ 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{14}}{35} & 0 & 0 & 0 & \frac{\sqrt{10}}{25} \\ 0 & 0 & 0 & \frac{\sqrt{210}}{420} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{35} & 0 & 0 & 0 \end{bmatrix}$
588	symmetry	z

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_1^{(1,0;a)}(A_1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{2}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{2}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{9\sqrt{2}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{2}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{2}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{9\sqrt{2}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{14} & 0 \end{bmatrix}$
589	symmetry	x
	$\mathbb{Q}_{1,1}^{(1,0;a)}(E)$	$\begin{bmatrix} \frac{\sqrt{10}}{20} & 0 & -\frac{1}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{20} & 0 & -\frac{\sqrt{3}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{20} & 0 & -\frac{\sqrt{6}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{20} & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{10}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & \frac{1}{28} & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{10}}{70} & 0 & \frac{6}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{28} & 0 & \frac{\sqrt{3}}{28} & 0 & 0 & 0 & 0 \\ 0 & \frac{6}{35} & 0 & \frac{9\sqrt{2}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{28} & 0 & \frac{\sqrt{6}}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{9\sqrt{2}}{70} & 0 & \frac{6}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & \frac{\sqrt{10}}{28} & 0 & 0 \\ 0 & 0 & 0 & \frac{6}{35} & 0 & \frac{3\sqrt{10}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{28} & 0 & \frac{\sqrt{15}}{28} & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{28} & 0 & \frac{\sqrt{21}}{28} \end{bmatrix}$
590	symmetry	y

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_{1,2}^{(1,0;a)}(E)$	$\begin{bmatrix} \frac{\sqrt{10}i}{20} & 0 & \frac{i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{20} & 0 & \frac{\sqrt{3}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{20} & 0 & \frac{\sqrt{6}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{20} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{10}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & -\frac{i}{28} & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{10}i}{70} & 0 & -\frac{6i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{28} & 0 & -\frac{\sqrt{3}i}{28} & 0 & 0 & 0 & 0 \\ 0 & \frac{6i}{35} & 0 & -\frac{9\sqrt{2}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{28} & 0 & -\frac{\sqrt{6}i}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{9\sqrt{2}i}{70} & 0 & -\frac{6i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{28} & 0 & -\frac{\sqrt{10}i}{28} & 0 & 0 \\ 0 & 0 & 0 & \frac{6i}{35} & 0 & -\frac{3\sqrt{10}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{28} & 0 & -\frac{\sqrt{15}i}{28} & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{10}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{28} & 0 & -\frac{\sqrt{21}i}{28} \end{bmatrix}$
591	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{Q}_3^{(1,0;a)}(A_1,1)$	$\begin{bmatrix} 0 & \frac{3\sqrt{7}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{42}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{28} & 0 & 0 \\ -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{7}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{2\sqrt{7}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{7}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 \end{bmatrix}$
592	symmetry	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_3^{(1,0;a)}(A_1,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}i}{560} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{112} & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 \\ -\frac{\sqrt{42}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} \\ 0 & -\frac{3\sqrt{70}i}{560} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{168} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{56} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & \frac{\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{112} & 0 \\ -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{112} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{48} \\ 0 & -\frac{\sqrt{70}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{168} & 0 & 0 & 0 & 0 \end{bmatrix}$
593	symmetry	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$
	$\mathbb{Q}_3^{(1,0;a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{560} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{112} & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 \\ -\frac{\sqrt{42}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} \\ 0 & -\frac{3\sqrt{70}}{560} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{168} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{56} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & \frac{\sqrt{6}}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{112} & 0 \\ -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{48} \\ 0 & -\frac{\sqrt{70}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{168} & 0 & 0 & 0 & 0 \end{bmatrix}$
594	symmetry	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_{3,1}^{(1,0;a)}(E,1)$	$\begin{bmatrix} -\frac{\sqrt{210}}{560} & 0 & \frac{3\sqrt{21}}{280} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{14}}{80} & 0 & -\frac{\sqrt{7}}{280} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{7}}{280} & 0 & -\frac{\sqrt{14}}{80} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{21}}{280} & 0 & \frac{\sqrt{210}}{560} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & \frac{\sqrt{35}}{28} & 0 \\ 0 & -\frac{\sqrt{210}}{70} & 0 & 0 & 0 & 0 & \frac{1}{24} & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{210}}{70} & 0 & \frac{\sqrt{21}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{168} & 0 & -\frac{\sqrt{7}}{84} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}}{70} & 0 & \frac{\sqrt{42}}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{336} & 0 & \frac{\sqrt{14}}{336} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}}{35} & 0 & \frac{\sqrt{21}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{336} & 0 & \frac{\sqrt{210}}{336} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}}{70} & 0 & -\frac{\sqrt{210}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{84} & 0 & \frac{\sqrt{35}}{168} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & -\frac{1}{24} \end{bmatrix}$
595	$\mathbb{Q}_{3,2}^{(1,0;a)}(E,1)$	$-\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$ $\begin{bmatrix} -\frac{\sqrt{210}i}{560} & 0 & -\frac{3\sqrt{21}i}{280} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{14}i}{80} & 0 & \frac{\sqrt{7}i}{280} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{7}i}{280} & 0 & \frac{\sqrt{14}i}{80} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{21}i}{280} & 0 & -\frac{\sqrt{210}i}{560} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & -\frac{\sqrt{35}i}{28} & 0 \\ 0 & \frac{\sqrt{210}i}{70} & 0 & 0 & 0 & 0 & \frac{i}{24} & 0 & \frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{210}i}{70} & 0 & -\frac{\sqrt{21}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{168} & 0 & \frac{\sqrt{7}i}{84} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}i}{70} & 0 & -\frac{\sqrt{42}i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{336} & 0 & -\frac{\sqrt{14}i}{336} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}i}{35} & 0 & -\frac{\sqrt{21}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{336} & 0 & -\frac{\sqrt{210}i}{336} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}i}{70} & 0 & \frac{\sqrt{210}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{84} & 0 & -\frac{\sqrt{35}i}{168} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 & \frac{i}{24} \end{bmatrix}$
596	symmetry	$\sqrt{15}xyz$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_{3,1}^{(1,0;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{210}i}{280} & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 \\ -\frac{\sqrt{7}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{35}i}{280} & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & \frac{3\sqrt{14}i}{56} & 0 & 0 \\ 0 & \frac{\sqrt{35}i}{280} & 0 & 0 & 0 & \frac{\sqrt{7}i}{56} & 0 & 0 & \frac{3\sqrt{14}i}{56} & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 \\ 0 & 0 & \frac{\sqrt{210}i}{280} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} \\ 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{210}i}{140} & 0 & 0 & \frac{\sqrt{2}i}{24} & 0 & 0 & 0 & \frac{\sqrt{70}i}{168} & 0 & 0 & 0 \\ -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{140} & 0 & 0 & \frac{\sqrt{7}i}{168} & 0 & 0 & 0 & \frac{\sqrt{21}i}{168} & 0 & 0 \\ 0 & -\frac{\sqrt{210}i}{140} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & -\frac{\sqrt{21}i}{168} & 0 & 0 & 0 & -\frac{\sqrt{7}i}{168} & 0 \\ 0 & 0 & \frac{\sqrt{210}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{168} & 0 & 0 & 0 & -\frac{\sqrt{2}i}{24} \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{84} & 0 & 0 & 0 \end{bmatrix}$
597	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{Q}_{3,2}^{(1,0;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{210}}{280} & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 \\ -\frac{\sqrt{7}}{56} & 0 & 0 & 0 & \frac{\sqrt{35}}{280} & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & -\frac{3\sqrt{14}}{56} & 0 & 0 \\ 0 & \frac{\sqrt{35}}{280} & 0 & 0 & 0 & -\frac{\sqrt{7}}{56} & 0 & 0 & \frac{3\sqrt{14}}{56} & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 \\ 0 & 0 & \frac{\sqrt{210}}{280} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & \frac{\sqrt{2}}{8} \\ 0 & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{210}}{140} & 0 & 0 & \frac{\sqrt{2}}{24} & 0 & 0 & 0 & -\frac{\sqrt{70}}{168} & 0 & 0 & 0 \\ -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & \frac{\sqrt{210}}{140} & 0 & 0 & \frac{\sqrt{7}}{168} & 0 & 0 & 0 & -\frac{\sqrt{21}}{168} & 0 & 0 \\ 0 & -\frac{\sqrt{210}}{140} & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & -\frac{\sqrt{21}}{168} & 0 & 0 & 0 & \frac{\sqrt{7}}{168} & 0 \\ 0 & 0 & \frac{\sqrt{210}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{168} & 0 & 0 & 0 & \frac{\sqrt{2}}{24} \\ 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{84} & 0 & 0 & 0 \end{bmatrix}$
598	symmetry	$\frac{z\left(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4\right)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_5^{(1,0;a)}(A_1,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{10} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{10} & 0 & 0 \\ \frac{\sqrt{5}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{420} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{210} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{210} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{420} & 0 \end{bmatrix}$
599	symmetry	$-\frac{\sqrt{70}y\left(3x^2-y^2\right)\left(x^2+y^2-8z^2\right)}{16}$
	$\mathbb{Q}_5^{(1,0;a)}(A_1,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{25} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{25} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{25} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{25} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{25} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{25} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{420} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{700} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{35} & -\frac{\sqrt{30}i}{300} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{700} & 0 \\ \frac{\sqrt{35}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{700} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{300} \\ 0 & -\frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{700} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{35}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{420} & 0 & 0 & 0 & 0 \end{bmatrix}$
600	symmetry	$-\frac{\sqrt{70}x\left(x^2-3y^2\right)\left(x^2+y^2-8z^2\right)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_5^{(1,0;a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{25} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{25} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{25} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{25} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{25} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{25} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{420} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{700} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{35} & -\frac{\sqrt{30}}{300} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{700} & 0 \\ \frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{700} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{300} \\ 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{700} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{420} & 0 & 0 & 0 & 0 \end{bmatrix}$
601	symmetry	$\frac{3\sqrt{14}x\left(x^4-10x^2y^2+5y^4\right)}{16}$
	$\mathbb{Q}_{5,1}^{(1,0;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{5} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{5} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{420} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{60} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{70}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{420} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
602	symmetry	$-\frac{3\sqrt{14}y\left(5x^4-10x^2y^2+y^4\right)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_{5,2}^{(1,0;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{5} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{5} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{420} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{60} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{70}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{420} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
603	symmetry	$\frac{\sqrt{15}x\left(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4\right)}{8}$
	$\mathbb{Q}_{5,1}^{(1,0;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{50} & 0 & \frac{\sqrt{2}}{10} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{50} & 0 & -\frac{\sqrt{6}}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{10} & 0 & \frac{3\sqrt{10}}{50} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{10} & 0 & -\frac{\sqrt{10}}{50} & 0 \\ 0 & \frac{\sqrt{15}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{840} & 0 & \frac{\sqrt{6}}{168} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{15}}{70} & 0 & -\frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 & \frac{23\sqrt{10}}{4200} & 0 & -\frac{13\sqrt{2}}{840} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{14} & 0 & \frac{\sqrt{3}}{7} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{15}}{2100} & 0 & \frac{1}{420} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{7} & 0 & -\frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 & -\frac{1}{420} & 0 & \frac{11\sqrt{15}}{2100} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{14} & 0 & \frac{\sqrt{15}}{70} & 0 & 0 & 0 & 0 & \frac{13\sqrt{2}}{840} & 0 & -\frac{23\sqrt{10}}{4200} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{168} & 0 & \frac{\sqrt{14}}{840} \end{bmatrix}$
604	symmetry	$\frac{\sqrt{15}y\left(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4\right)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_{5,2}^{(1,0;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{50} & 0 & -\frac{\sqrt{2}i}{10} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}i}{50} & 0 & \frac{\sqrt{6}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{10} & 0 & -\frac{3\sqrt{10}i}{50} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{10} & 0 & \frac{\sqrt{10}i}{50} & 0 \\ 0 & -\frac{\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{840} & 0 & -\frac{\sqrt{6}i}{168} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{15}i}{70} & 0 & \frac{\sqrt{6}i}{14} & 0 & 0 & 0 & 0 & \frac{23\sqrt{10}i}{4200} & 0 & \frac{13\sqrt{2}i}{840} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{14} & 0 & -\frac{\sqrt{3}i}{7} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{15}i}{2100} & 0 & -\frac{i}{420} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{7} & 0 & \frac{\sqrt{6}i}{14} & 0 & 0 & 0 & 0 & -\frac{i}{420} & 0 & -\frac{11\sqrt{15}i}{2100} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{14} & 0 & -\frac{\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & \frac{13\sqrt{2}i}{840} & 0 & \frac{23\sqrt{10}i}{4200} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{168} & 0 & -\frac{\sqrt{14}i}{840} \end{bmatrix}$
605	symmetry	$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$
	$\mathbb{Q}_{5,1}^{(1,0;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{50} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{50} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{50} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{50} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{2100} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{150} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{150} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{2100} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{140} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
606	symmetry	$\frac{3\sqrt{35}z\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_{5,2}^{(1,0;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{50} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{50} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{50} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{50} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{2100} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{150} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{150} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{2100} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{140} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
607	symmetry	$-\frac{\sqrt{105}xyz\left(x^2+y^2-2z^2\right)}{2}$
	$\mathbb{Q}_{5,1}^{(1,0;a)}(E,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{100} & 0 & 0 & 0 & -\frac{\sqrt{14}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{100} & 0 & 0 & 0 & \frac{3\sqrt{70}i}{100} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}i}{100} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{100} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{20} & 0 & 0 & 0 & \frac{\sqrt{10}i}{100} \\ 0 & 0 & -\frac{\sqrt{210}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{420} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & -\frac{\sqrt{10}i}{300} & 0 & 0 & 0 & \frac{\sqrt{14}i}{210} & 0 & 0 & 0 \\ \frac{\sqrt{210}i}{140} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & \frac{2\sqrt{35}i}{525} & 0 & 0 & 0 & \frac{\sqrt{105}i}{1050} & 0 & 0 \\ 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 & \frac{\sqrt{210}i}{140} & 0 & 0 & -\frac{\sqrt{105}i}{1050} & 0 & 0 & 0 & -\frac{2\sqrt{35}i}{525} & 0 \\ 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{210} & 0 & 0 & 0 & \frac{\sqrt{10}i}{300} \\ 0 & 0 & 0 & -\frac{\sqrt{210}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{420} & 0 & 0 & 0 \end{bmatrix}$
608	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)\left(x^2+y^2-2z^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_{5,2}^{(1,0;a)}(E,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{100} & 0 & 0 & 0 & \frac{\sqrt{14}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{100} & 0 & 0 & 0 & -\frac{3\sqrt{70}}{100} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{100} & 0 & 0 & 0 & \frac{\sqrt{210}}{100} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{20} & 0 & 0 & 0 & -\frac{\sqrt{10}}{100} \\ 0 & 0 & \frac{\sqrt{210}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{420} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & -\frac{\sqrt{10}}{300} & 0 & 0 & 0 & -\frac{\sqrt{14}}{210} & 0 & 0 & 0 \\ \frac{\sqrt{210}}{140} & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & \frac{2\sqrt{35}}{525} & 0 & 0 & 0 & -\frac{\sqrt{105}}{1050} & 0 & 0 \\ 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & -\frac{\sqrt{210}}{140} & 0 & 0 & -\frac{\sqrt{105}}{1050} & 0 & 0 & 0 & \frac{2\sqrt{35}}{525} & 0 \\ 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{210} & 0 & 0 & 0 & -\frac{\sqrt{10}}{300} \\ 0 & 0 & 0 & -\frac{\sqrt{210}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{420} & 0 & 0 & 0 \end{bmatrix}$
609	symmetry	z
	$\mathbb{Q}_{1}^{(1,1;a)}(A_1)$	$\begin{bmatrix} 0 & -\frac{1}{5} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{1}{5} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{2}{7} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{6}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{2}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{2}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{6}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{2}{7} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{28} & 0 \end{bmatrix}$
610	symmetry	x

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_{1,1}^{(1,1;a)}(E)$	$\begin{bmatrix} \frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{2}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{10} & 0 & -\frac{\sqrt{6}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{20} & 0 & -\frac{\sqrt{3}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{20} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{2\sqrt{5}}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{2}}{56} & 0 & 0 & 0 & 0 & 0 \\ -\frac{2\sqrt{5}}{35} & 0 & -\frac{4\sqrt{2}}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{56} & 0 & \frac{\sqrt{6}}{56} & 0 & 0 & 0 & 0 \\ 0 & -\frac{4\sqrt{2}}{35} & 0 & -\frac{6}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{28} & 0 & \frac{\sqrt{3}}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{6}{35} & 0 & -\frac{4\sqrt{2}}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{28} & 0 & \frac{\sqrt{5}}{28} & 0 & 0 \\ 0 & 0 & 0 & -\frac{4\sqrt{2}}{35} & 0 & -\frac{2\sqrt{5}}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{56} & 0 & \frac{\sqrt{30}}{56} & 0 \\ 0 & 0 & 0 & 0 & -\frac{2\sqrt{5}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{56} & 0 & \frac{\sqrt{42}}{56} \end{bmatrix}$
611	symmetry	y
	$\mathbb{Q}_{1,2}^{(1,1;a)}(E)$	$\begin{bmatrix} \frac{\sqrt{5}i}{10} & 0 & \frac{\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{10} & 0 & \frac{\sqrt{6}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{20} & 0 & \frac{\sqrt{3}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{20} & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{2\sqrt{5}i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & -\frac{\sqrt{2}i}{56} & 0 & 0 & 0 & 0 & 0 \\ -\frac{2\sqrt{5}i}{35} & 0 & \frac{4\sqrt{2}i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{56} & 0 & -\frac{\sqrt{6}i}{56} & 0 & 0 & 0 & 0 \\ 0 & -\frac{4\sqrt{2}i}{35} & 0 & \frac{6i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{28} & 0 & -\frac{\sqrt{3}i}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{6i}{35} & 0 & \frac{4\sqrt{2}i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{28} & 0 & -\frac{\sqrt{5}i}{28} & 0 & 0 \\ 0 & 0 & 0 & -\frac{4\sqrt{2}i}{35} & 0 & \frac{2\sqrt{5}i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{56} & 0 & -\frac{\sqrt{30}i}{56} & 0 \\ 0 & 0 & 0 & 0 & -\frac{2\sqrt{5}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{56} & 0 & -\frac{\sqrt{42}i}{56} \end{bmatrix}$
612	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_3^{(1,1;a)}(A_1,1)$	$\begin{bmatrix} 0 & \frac{9}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{9}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{28} & 0 & 0 \\ \frac{5}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{1}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{2}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{2}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{1}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{28} & 0 \end{bmatrix}$
613	symmetry	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$
	$\mathbb{Q}_3^{(1,1;a)}(A_1,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{9\sqrt{10}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{15\sqrt{6}i}{112} & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & \frac{i}{14} & 0 \\ -\frac{15\sqrt{6}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} \\ 0 & -\frac{9\sqrt{10}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{5i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3i}{56} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5i}{42} & \frac{\sqrt{42}i}{112} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{6}i}{112} & 0 \\ \frac{5i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{6}i}{112} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{112} \\ 0 & \frac{\sqrt{10}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3i}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{5i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{56} & 0 & 0 & 0 & 0 \end{bmatrix}$
614	symmetry	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_3^{(1,1;a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{9\sqrt{10}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{15\sqrt{6}}{112} & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{1}{14} & 0 \\ -\frac{15\sqrt{6}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} \\ 0 & -\frac{9\sqrt{10}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3}{56} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{5}{42} & \frac{\sqrt{42}}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{6}}{112} & 0 \\ \frac{5}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{6}}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{112} \\ 0 & \frac{\sqrt{10}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{5}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{56} & 0 & 0 & 0 & 0 \end{bmatrix}$
615	symmetry	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{Q}_{3,1}^{(1,1;a)}(E,1)$	$\begin{bmatrix} -\frac{3\sqrt{30}}{112} & 0 & \frac{9\sqrt{3}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{28} & 0 & -\frac{1}{14} & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{2}}{16} & 0 & -\frac{3}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{3}{56} & 0 & -\frac{3\sqrt{2}}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{9\sqrt{3}}{56} & 0 & \frac{3\sqrt{30}}{112} & 0 & 0 & 0 & 0 & -\frac{1}{14} & 0 & \frac{\sqrt{5}}{28} & 0 \\ 0 & \frac{\sqrt{30}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{56} & 0 & -\frac{\sqrt{3}}{28} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{30}}{42} & 0 & -\frac{\sqrt{3}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{56} & 0 & -\frac{1}{28} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{42} & 0 & -\frac{\sqrt{6}}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{112} & 0 & \frac{\sqrt{2}}{112} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{21} & 0 & -\frac{\sqrt{3}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{112} & 0 & \frac{\sqrt{30}}{112} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{42} & 0 & \frac{\sqrt{30}}{42} & 0 & 0 & 0 & 0 & \frac{1}{28} & 0 & \frac{\sqrt{5}}{56} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{28} & 0 & -\frac{\sqrt{7}}{56} \end{bmatrix}$
616	symmetry	$-\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_{3,2}^{(1,1;a)}(E,1)$	$\begin{bmatrix} -\frac{3\sqrt{30}i}{112} & 0 & -\frac{9\sqrt{3}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{28} & 0 & \frac{i}{14} & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{2}i}{16} & 0 & \frac{3i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{3i}{56} & 0 & \frac{3\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{9\sqrt{3}i}{56} & 0 & -\frac{3\sqrt{30}i}{112} & 0 & 0 & 0 & 0 & -\frac{i}{14} & 0 & -\frac{\sqrt{5}i}{28} & 0 \\ 0 & -\frac{\sqrt{30}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{56} & 0 & \frac{\sqrt{3}i}{28} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{30}i}{42} & 0 & \frac{\sqrt{3}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{56} & 0 & \frac{i}{28} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{42} & 0 & \frac{\sqrt{6}i}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{112} & 0 & -\frac{\sqrt{2}i}{112} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{21} & 0 & \frac{\sqrt{3}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{112} & 0 & -\frac{\sqrt{30}i}{112} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}i}{42} & 0 & -\frac{\sqrt{30}i}{42} & 0 & 0 & 0 & 0 & \frac{i}{28} & 0 & -\frac{\sqrt{5}i}{56} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{28} & 0 & \frac{\sqrt{7}i}{56} \end{bmatrix}$
617	symmetry	$\sqrt{15}xyz$
	$\mathbb{Q}_{3,1}^{(1,1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{3\sqrt{30}i}{56} & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & \frac{\sqrt{10}i}{56} & 0 & 0 & 0 \\ -\frac{15i}{56} & 0 & 0 & 0 & -\frac{3\sqrt{5}i}{56} & 0 & 0 & \frac{\sqrt{6}i}{56} & 0 & 0 & 0 & \frac{3\sqrt{2}i}{56} & 0 & 0 \\ 0 & \frac{3\sqrt{5}i}{56} & 0 & 0 & 0 & \frac{15i}{56} & 0 & 0 & \frac{3\sqrt{2}i}{56} & 0 & 0 & 0 & \frac{\sqrt{6}i}{56} & 0 \\ 0 & 0 & \frac{3\sqrt{30}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} \\ 0 & 0 & -\frac{5\sqrt{6}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}i}{84} & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & \frac{\sqrt{10}i}{56} & 0 & 0 & 0 \\ \frac{5\sqrt{6}i}{84} & 0 & 0 & 0 & \frac{\sqrt{30}i}{84} & 0 & 0 & \frac{i}{56} & 0 & 0 & 0 & \frac{\sqrt{3}i}{56} & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{84} & 0 & 0 & 0 & \frac{5\sqrt{6}i}{84} & 0 & 0 & -\frac{\sqrt{3}i}{56} & 0 & 0 & 0 & -\frac{i}{56} & 0 \\ 0 & 0 & -\frac{\sqrt{30}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} \\ 0 & 0 & 0 & -\frac{5\sqrt{6}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{28} & 0 & 0 & 0 \end{bmatrix}$
618	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_{3,2}^{(1,1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{3\sqrt{30}}{56} & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & -\frac{\sqrt{10}}{56} & 0 & 0 & 0 \\ -\frac{15}{56} & 0 & 0 & 0 & \frac{3\sqrt{5}}{56} & 0 & 0 & \frac{\sqrt{6}}{56} & 0 & 0 & 0 & -\frac{3\sqrt{2}}{56} & 0 & 0 \\ 0 & \frac{3\sqrt{5}}{56} & 0 & 0 & 0 & -\frac{15}{56} & 0 & 0 & \frac{3\sqrt{2}}{56} & 0 & 0 & 0 & -\frac{\sqrt{6}}{56} & 0 \\ 0 & 0 & \frac{3\sqrt{30}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{56} & 0 & 0 & 0 & \frac{\sqrt{14}}{56} \\ 0 & 0 & \frac{5\sqrt{6}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}}{84} & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & -\frac{\sqrt{10}}{56} & 0 & 0 & 0 \\ \frac{5\sqrt{6}}{84} & 0 & 0 & 0 & -\frac{\sqrt{30}}{84} & 0 & 0 & \frac{1}{56} & 0 & 0 & 0 & -\frac{\sqrt{3}}{56} & 0 & 0 \\ 0 & \frac{\sqrt{30}}{84} & 0 & 0 & 0 & -\frac{5\sqrt{6}}{84} & 0 & 0 & -\frac{\sqrt{3}}{56} & 0 & 0 & 0 & \frac{1}{56} & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{56} & 0 & 0 & 0 & \frac{\sqrt{14}}{56} \\ 0 & 0 & 0 & -\frac{5\sqrt{6}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{28} & 0 & 0 & 0 \end{bmatrix}$
619	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{G}_2^{(a)}(A_2)$	$\begin{bmatrix} 0 & \frac{3\sqrt{10}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}i}{70} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}i}{70} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{14} & 0 & 0 \\ -\frac{\sqrt{10}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3i}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{70} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{70} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3i}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{14} & 0 \end{bmatrix}$
620	symmetry	$\sqrt{3}yz$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{2,1}^{(a)}(E,1)$	$\begin{bmatrix} \frac{\sqrt{6}}{14} & 0 & \frac{3\sqrt{15}}{70} & 0 & 0 & 0 & 0 & \frac{1}{14} & 0 & \frac{\sqrt{5}}{70} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{70} & 0 & \frac{\sqrt{5}}{14} & 0 & 0 & 0 & 0 & \frac{1}{14} & 0 & \frac{\sqrt{15}}{70} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{14} & 0 & \frac{\sqrt{10}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{70} & 0 & \frac{1}{14} & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{15}}{70} & 0 & -\frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{70} & 0 & \frac{1}{14} & 0 \\ 0 & -\frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & \frac{\sqrt{15}}{28} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}}{28} & 0 & -\frac{\sqrt{15}}{70} & 0 & 0 & 0 & 0 & \frac{1}{28} & 0 & \frac{11\sqrt{5}}{140} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{6}}{28} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{70} & 0 & \frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{5}}{140} & 0 & -\frac{1}{28} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{28} & 0 & -\frac{\sqrt{35}}{28} \end{bmatrix}$
621	symmetry	$-\sqrt{3}xz$
	$\mathbb{G}_{2,2}^{(a)}(E,1)$	$\begin{bmatrix} \frac{\sqrt{6}i}{14} & 0 & -\frac{3\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & \frac{i}{14} & 0 & -\frac{\sqrt{5}i}{70} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{70} & 0 & -\frac{\sqrt{5}i}{14} & 0 & 0 & 0 & 0 & \frac{i}{14} & 0 & -\frac{\sqrt{15}i}{70} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}i}{14} & 0 & -\frac{\sqrt{10}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{70} & 0 & -\frac{i}{14} & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{15}i}{70} & 0 & \frac{\sqrt{6}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{70} & 0 & -\frac{i}{14} & 0 \\ 0 & \frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & -\frac{\sqrt{15}i}{28} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}i}{28} & 0 & \frac{\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & \frac{i}{28} & 0 & -\frac{11\sqrt{5}i}{140} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{28} & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & -\frac{\sqrt{6}i}{28} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{70} & 0 & -\frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{5}i}{140} & 0 & \frac{i}{28} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{28} & 0 & \frac{\sqrt{35}i}{28} \end{bmatrix}$
622	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{2,1}^{(a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{15}i}{35} & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & \frac{\sqrt{5}i}{140} & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{7} & 0 & 0 & 0 & \frac{2\sqrt{10}i}{35} & 0 & 0 & \frac{\sqrt{3}i}{28} & 0 & 0 & 0 & \frac{i}{28} & 0 & 0 \\ 0 & -\frac{2\sqrt{10}i}{35} & 0 & 0 & 0 & \frac{\sqrt{2}i}{7} & 0 & 0 & \frac{i}{28} & 0 & 0 & 0 & \frac{\sqrt{3}i}{28} & 0 \\ 0 & 0 & -\frac{\sqrt{15}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{140} & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} \\ 0 & 0 & -\frac{\sqrt{3}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{15}i}{140} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & \frac{2\sqrt{5}i}{35} & 0 & 0 & 0 \\ -\frac{\sqrt{3}i}{28} & 0 & 0 & 0 & -\frac{3\sqrt{15}i}{140} & 0 & 0 & -\frac{\sqrt{2}i}{7} & 0 & 0 & 0 & \frac{\sqrt{6}i}{14} & 0 & 0 \\ 0 & -\frac{3\sqrt{15}i}{140} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{28} & 0 & 0 & -\frac{\sqrt{6}i}{14} & 0 & 0 & 0 & \frac{\sqrt{2}i}{7} & 0 \\ 0 & 0 & -\frac{3\sqrt{15}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{5}i}{35} & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} \\ 0 & 0 & 0 & -\frac{\sqrt{3}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{14} & 0 & 0 & 0 \end{bmatrix}$
623	symmetry	$-\sqrt{3}xy$
	$\mathbb{G}_{2,2}^{(a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{15}}{35} & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & -\frac{\sqrt{5}}{140} & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{7} & 0 & 0 & 0 & -\frac{2\sqrt{10}}{35} & 0 & 0 & \frac{\sqrt{3}}{28} & 0 & 0 & 0 & -\frac{1}{28} & 0 & 0 \\ 0 & -\frac{2\sqrt{10}}{35} & 0 & 0 & 0 & -\frac{\sqrt{2}}{7} & 0 & 0 & \frac{1}{28} & 0 & 0 & 0 & -\frac{\sqrt{3}}{28} & 0 \\ 0 & 0 & -\frac{\sqrt{15}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{140} & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} \\ 0 & 0 & \frac{\sqrt{3}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{15}}{140} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & -\frac{2\sqrt{5}}{35} & 0 & 0 & 0 \\ -\frac{\sqrt{3}}{28} & 0 & 0 & 0 & \frac{3\sqrt{15}}{140} & 0 & 0 & -\frac{\sqrt{2}}{7} & 0 & 0 & 0 & -\frac{\sqrt{6}}{14} & 0 & 0 \\ 0 & -\frac{3\sqrt{15}}{140} & 0 & 0 & 0 & \frac{\sqrt{3}}{28} & 0 & 0 & -\frac{\sqrt{6}}{14} & 0 & 0 & 0 & -\frac{\sqrt{2}}{7} & 0 \\ 0 & 0 & -\frac{3\sqrt{15}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{5}}{35} & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{14} & 0 & 0 & 0 \end{bmatrix}$
624	symmetry	$\frac{\sqrt{70}xz\left(x^2-3y^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_4^{(a)}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{7}i}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & -\frac{3i}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}i}{70} & 0 \\ \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{70} & 0 & 0 & 0 & 0 & 0 & \frac{3i}{20} \\ 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{7}i}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & \frac{3\sqrt{6}i}{40} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{280} & 0 \\ \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{280} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{6}i}{40} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 \end{bmatrix}$
625	symmetry	$\frac{3x^4}{8}+\frac{3x^2y^2}{4}-3x^2z^2+\frac{3y^4}{8}-3y^2z^2+z^4$
	$\mathbb{G}_4^{(a)}(A_2,1)$	$\begin{bmatrix} 0 & -\frac{i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{10}i}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{10}i}{140} & 0 & 0 \\ \frac{i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{10}i}{35} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{i}{7} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{7} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{10}i}{35} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{14} & 0 \end{bmatrix}$
626	symmetry	$\frac{\sqrt{70}yz\left(3x^2-y^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_4^{(a)}(A_2,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{7}}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & \frac{3}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{70} & 0 \\ -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{70} & 0 & 0 & 0 & 0 & 0 & \frac{3}{20} \\ 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{7}}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & -\frac{3\sqrt{6}}{40} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{280} & 0 \\ -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{280} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{6}}{40} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 \end{bmatrix}$
627	symmetry	$-\frac{\sqrt{10}yz\left(3x^2+3y^2-4z^2\right)}{4}$
	$\mathbb{G}_{4,1}^{(a)}(E,1)$	$\begin{bmatrix} -\frac{\sqrt{2}}{56} & 0 & -\frac{\sqrt{5}}{28} & 0 & 0 & 0 & 0 & -\frac{9\sqrt{3}}{140} & 0 & -\frac{3\sqrt{15}}{70} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{56} & 0 & \frac{\sqrt{15}}{28} & 0 & 0 & 0 & 0 & \frac{3\sqrt{3}}{35} & 0 & \frac{3\sqrt{5}}{140} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}}{28} & 0 & -\frac{\sqrt{30}}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}}{140} & 0 & \frac{3\sqrt{3}}{35} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{28} & 0 & \frac{\sqrt{2}}{56} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{15}}{70} & 0 & -\frac{9\sqrt{3}}{140} & 0 \\ 0 & \frac{\sqrt{2}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 & -\frac{\sqrt{5}}{14} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{14} & 0 & -\frac{\sqrt{5}}{14} & 0 & 0 & 0 & 0 & \frac{13\sqrt{3}}{140} & 0 & \frac{\sqrt{15}}{70} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{280} & 0 & \frac{\sqrt{30}}{40} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{40} & 0 & \frac{\sqrt{2}}{280} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{14} & 0 & -\frac{\sqrt{2}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{70} & 0 & -\frac{13\sqrt{3}}{140} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{14} & 0 & \frac{\sqrt{105}}{140} \end{bmatrix}$
628	symmetry	$\frac{\sqrt{10}xz\left(3x^2+3y^2-4z^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{4,2}^{(a)}(E,1)$	$\begin{bmatrix} -\frac{\sqrt{2}i}{56} & 0 & \frac{\sqrt{5}i}{28} & 0 & 0 & 0 & 0 & -\frac{9\sqrt{3}i}{140} & 0 & \frac{3\sqrt{15}i}{70} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{56} & 0 & -\frac{\sqrt{15}i}{28} & 0 & 0 & 0 & 0 & \frac{3\sqrt{3}i}{35} & 0 & -\frac{3\sqrt{5}i}{140} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}i}{28} & 0 & \frac{\sqrt{30}i}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}i}{140} & 0 & -\frac{3\sqrt{3}i}{35} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{28} & 0 & -\frac{\sqrt{2}i}{56} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{15}i}{70} & 0 & \frac{9\sqrt{3}i}{140} & 0 \\ 0 & -\frac{\sqrt{2}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{140} & 0 & \frac{\sqrt{5}i}{14} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{14} & 0 & \frac{\sqrt{5}i}{14} & 0 & 0 & 0 & 0 & \frac{13\sqrt{3}i}{140} & 0 & -\frac{\sqrt{15}i}{70} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{280} & 0 & -\frac{\sqrt{30}i}{40} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{40} & 0 & -\frac{\sqrt{2}i}{280} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{14} & 0 & \frac{\sqrt{2}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{70} & 0 & \frac{13\sqrt{3}i}{140} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{14} & 0 & -\frac{\sqrt{105}i}{140} \end{bmatrix}$
629	symmetry	$\frac{\sqrt{35}\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$
	$\mathbb{G}_{4,1}^{(a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{42}i}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{42}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{35} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{70} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
630	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{4,2}^{(a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{42}}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{42}}{140} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{35} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{35} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
631	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$
	$\mathbb{G}_{4,1}^{(a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{10}i}{28} & 0 & 0 & -\frac{3\sqrt{42}i}{280} & 0 & 0 & 0 & -\frac{9\sqrt{30}i}{280} & 0 & 0 & 0 \\ \frac{\sqrt{3}i}{28} & 0 & 0 & 0 & \frac{\sqrt{15}i}{28} & 0 & 0 & \frac{33\sqrt{2}i}{280} & 0 & 0 & 0 & -\frac{3\sqrt{6}i}{280} & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{28} & 0 & 0 & -\frac{3\sqrt{6}i}{280} & 0 & 0 & 0 & \frac{33\sqrt{2}i}{280} & 0 \\ 0 & 0 & \frac{\sqrt{10}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{30}i}{280} & 0 & 0 & 0 & -\frac{3\sqrt{42}i}{280} \\ 0 & 0 & \frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}i}{28} & 0 & 0 & \frac{3\sqrt{42}i}{140} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{140} & 0 & 0 & 0 \\ \frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{10}i}{28} & 0 & 0 & -\frac{9\sqrt{3}i}{140} & 0 & 0 & 0 & \frac{17i}{140} & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{28} & 0 & 0 & 0 & \frac{3\sqrt{2}i}{28} & 0 & 0 & -\frac{17i}{140} & 0 & 0 & 0 & \frac{9\sqrt{3}i}{140} & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{140} & 0 & 0 & 0 & -\frac{3\sqrt{42}i}{140} \\ 0 & 0 & 0 & \frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{14} & 0 & 0 & 0 \end{bmatrix}$
632	symmetry	$\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{4,2}^{(a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{10}}{28} & 0 & 0 & -\frac{3\sqrt{42}}{280} & 0 & 0 & 0 & \frac{9\sqrt{30}}{280} & 0 & 0 & 0 \\ \frac{\sqrt{3}}{28} & 0 & 0 & 0 & -\frac{\sqrt{15}}{28} & 0 & 0 & \frac{33\sqrt{2}}{280} & 0 & 0 & 0 & \frac{3\sqrt{6}}{280} & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{28} & 0 & 0 & 0 & \frac{\sqrt{3}}{28} & 0 & 0 & -\frac{3\sqrt{6}}{280} & 0 & 0 & 0 & -\frac{33\sqrt{2}}{280} & 0 \\ 0 & 0 & \frac{\sqrt{10}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{30}}{280} & 0 & 0 & 0 & \frac{3\sqrt{42}}{280} \\ 0 & 0 & -\frac{3\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{28} & 0 & 0 & \frac{3\sqrt{42}}{140} & 0 & 0 & 0 & \frac{\sqrt{30}}{140} & 0 & 0 & 0 \\ \frac{3\sqrt{2}}{28} & 0 & 0 & 0 & \frac{\sqrt{10}}{28} & 0 & 0 & -\frac{9\sqrt{3}}{140} & 0 & 0 & 0 & -\frac{17}{140} & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{28} & 0 & 0 & 0 & -\frac{3\sqrt{2}}{28} & 0 & 0 & -\frac{17}{140} & 0 & 0 & 0 & -\frac{9\sqrt{3}}{140} & 0 \\ 0 & 0 & -\frac{\sqrt{10}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{140} & 0 & 0 & 0 & \frac{3\sqrt{42}}{140} \\ 0 & 0 & 0 & \frac{3\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{14} & 0 & 0 & 0 \end{bmatrix}$
633	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{G}_{2}^{(1,-1;a)}(A_2)$	$\begin{bmatrix} 0 & -\frac{3\sqrt{6}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}i}{35} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{6\sqrt{3}i}{35} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{6\sqrt{3}i}{35} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{6}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}i}{35} & 0 & 0 \\ \frac{\sqrt{6}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{4\sqrt{6}i}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{70} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{4\sqrt{6}i}{105} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{70} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{105} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{15}i}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3i}{14} & 0 \end{bmatrix}$
634	symmetry	$\sqrt{3}yz$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} -\frac{3\sqrt{10}}{140} & 0 & -\frac{9}{140} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}}{35} & 0 & -\frac{2\sqrt{3}}{35} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{140} & 0 & -\frac{\sqrt{3}}{28} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}}{35} & 0 & -\frac{6}{35} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{28} & 0 & -\frac{\sqrt{6}}{140} & 0 & 0 & 0 & 0 & -\frac{6}{35} & 0 & -\frac{2\sqrt{15}}{35} & 0 & 0 \\ 0 & 0 & 0 & \frac{9}{140} & 0 & \frac{3\sqrt{10}}{140} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{3}}{35} & 0 & -\frac{2\sqrt{15}}{35} & 0 \\ 0 & \frac{\sqrt{10}}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & \frac{3}{28} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{10}}{35} & 0 & \frac{2}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{140} & 0 & \frac{11\sqrt{3}}{140} & 0 & 0 & 0 & 0 \\ 0 & -\frac{2}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{140} & 0 & \frac{\sqrt{6}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{2}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{20} & 0 & \frac{3\sqrt{10}}{140} & 0 & 0 \\ 0 & 0 & 0 & \frac{2}{35} & 0 & -\frac{\sqrt{10}}{35} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{3}}{140} & 0 & -\frac{\sqrt{15}}{140} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3}{28} & 0 & -\frac{\sqrt{21}}{28} \end{bmatrix}$
635	symmetry	$-\sqrt{3}xz$
	$\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} -\frac{3\sqrt{10}i}{140} & 0 & \frac{9i}{140} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}i}{35} & 0 & \frac{2\sqrt{3}i}{35} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{140} & 0 & \frac{\sqrt{3}i}{28} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}i}{35} & 0 & \frac{6i}{35} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{28} & 0 & \frac{\sqrt{6}i}{140} & 0 & 0 & 0 & 0 & -\frac{6i}{35} & 0 & \frac{2\sqrt{15}i}{35} & 0 & 0 \\ 0 & 0 & 0 & \frac{9i}{140} & 0 & -\frac{3\sqrt{10}i}{140} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{3}i}{35} & 0 & \frac{2\sqrt{15}i}{35} & 0 \\ 0 & -\frac{\sqrt{10}i}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & -\frac{3i}{28} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{10}i}{35} & 0 & -\frac{2i}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{140} & 0 & -\frac{11\sqrt{3}i}{140} & 0 & 0 & 0 & 0 \\ 0 & -\frac{2i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{140} & 0 & -\frac{\sqrt{6}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{2i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{20} & 0 & -\frac{3\sqrt{10}i}{140} & 0 & 0 \\ 0 & 0 & 0 & \frac{2i}{35} & 0 & \frac{\sqrt{10}i}{35} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{3}i}{140} & 0 & \frac{\sqrt{15}i}{140} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3i}{28} & 0 & \frac{\sqrt{21}i}{28} \end{bmatrix}$
636	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{3i}{70} & 0 & 0 & -\frac{\sqrt{105}i}{35} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{35} & 0 & 0 & 0 \\ \frac{\sqrt{30}i}{70} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{35} & 0 & 0 & -\frac{3\sqrt{5}i}{35} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{35} & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{35} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{70} & 0 & 0 & -\frac{\sqrt{15}i}{35} & 0 & 0 & 0 & -\frac{3\sqrt{5}i}{35} & 0 \\ 0 & 0 & \frac{3i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{35} & 0 & 0 & 0 & -\frac{\sqrt{105}i}{35} \\ 0 & 0 & \frac{\sqrt{5}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{70} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3i}{35} & 0 & 0 & -\frac{\sqrt{105}i}{70} & 0 & 0 & 0 & \frac{2\sqrt{3}i}{35} & 0 & 0 & 0 \\ \frac{\sqrt{5}i}{35} & 0 & 0 & 0 & \frac{3i}{35} & 0 & 0 & -\frac{\sqrt{30}i}{35} & 0 & 0 & 0 & \frac{3\sqrt{10}i}{70} & 0 & 0 \\ 0 & \frac{3i}{35} & 0 & 0 & 0 & \frac{\sqrt{5}i}{35} & 0 & 0 & -\frac{3\sqrt{10}i}{70} & 0 & 0 & 0 & \frac{\sqrt{30}i}{35} & 0 \\ 0 & 0 & \frac{3i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{3}i}{35} & 0 & 0 & 0 & \frac{\sqrt{105}i}{70} \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{70} & 0 & 0 & 0 \end{bmatrix}$
637	symmetry	$-\sqrt{3}xy$
	$\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{3}{70} & 0 & 0 & -\frac{\sqrt{105}}{35} & 0 & 0 & 0 & \frac{\sqrt{3}}{35} & 0 & 0 & 0 \\ \frac{\sqrt{30}}{70} & 0 & 0 & 0 & \frac{\sqrt{6}}{35} & 0 & 0 & -\frac{3\sqrt{5}}{35} & 0 & 0 & 0 & \frac{\sqrt{15}}{35} & 0 & 0 \\ 0 & \frac{\sqrt{6}}{35} & 0 & 0 & 0 & \frac{\sqrt{30}}{70} & 0 & 0 & -\frac{\sqrt{15}}{35} & 0 & 0 & 0 & \frac{3\sqrt{5}}{35} & 0 \\ 0 & 0 & \frac{3}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{35} & 0 & 0 & 0 & \frac{\sqrt{105}}{35} \\ 0 & 0 & -\frac{\sqrt{5}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{70} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3}{35} & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & -\frac{2\sqrt{3}}{35} & 0 & 0 & 0 \\ \frac{\sqrt{5}}{35} & 0 & 0 & 0 & -\frac{3}{35} & 0 & 0 & -\frac{\sqrt{30}}{35} & 0 & 0 & 0 & -\frac{3\sqrt{10}}{70} & 0 & 0 \\ 0 & \frac{3}{35} & 0 & 0 & 0 & -\frac{\sqrt{5}}{35} & 0 & 0 & -\frac{3\sqrt{10}}{70} & 0 & 0 & 0 & -\frac{\sqrt{30}}{35} & 0 \\ 0 & 0 & \frac{3}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{3}}{35} & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} \\ 0 & 0 & 0 & \frac{\sqrt{5}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{70} & 0 & 0 & 0 \end{bmatrix}$
638	symmetry	$\frac{\sqrt{70}xz\left(x^2-3y^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_4^{(1,-1;a)}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{336} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{112} & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 \\ -\frac{\sqrt{14}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} \\ 0 & \frac{\sqrt{210}i}{336} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{24} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & \frac{3\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{112} & 0 \\ -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{112} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{16} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}i}{56} & 0 & 0 & 0 & 0 \end{bmatrix}$
639	symmetry	$\frac{3x^4}{8}+\frac{3x^2y^2}{4}-3x^2z^2+\frac{3y^4}{8}-3y^2z^2+z^4$
	$\mathbb{G}_4^{(1,-1;a)}(A_2,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{3}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}i}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}i}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{28} & 0 & 0 \\ -\frac{\sqrt{3}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{21} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{2}i}{28} & 0 \end{bmatrix}$
640	symmetry	$\frac{\sqrt{70}yz\left(3x^2-y^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_4^{(1,-1;a)}(A_2,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{336} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{112} & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 \\ \frac{\sqrt{14}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} \\ 0 & -\frac{\sqrt{210}}{336} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{24} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & -\frac{3\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{112} & 0 \\ \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{112} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{16} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}}{56} & 0 & 0 & 0 & 0 \end{bmatrix}$
641	symmetry	$-\frac{\sqrt{10}yz\left(3x^2+3y^2-4z^2\right)}{4}$
	$\mathbb{G}_{4,1}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} \frac{\sqrt{6}}{336} & 0 & \frac{\sqrt{15}}{168} & 0 & 0 & 0 & 0 & \frac{3}{28} & 0 & \frac{\sqrt{5}}{14} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{112} & 0 & -\frac{\sqrt{5}}{56} & 0 & 0 & 0 & 0 & -\frac{1}{7} & 0 & -\frac{\sqrt{15}}{84} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}}{56} & 0 & \frac{\sqrt{10}}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{84} & 0 & -\frac{1}{7} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{168} & 0 & -\frac{\sqrt{6}}{336} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{14} & 0 & \frac{3}{28} & 0 \\ 0 & -\frac{\sqrt{6}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{56} & 0 & -\frac{5\sqrt{15}}{84} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}}{42} & 0 & \frac{\sqrt{15}}{42} & 0 & 0 & 0 & 0 & \frac{13}{56} & 0 & \frac{\sqrt{5}}{28} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{336} & 0 & \frac{\sqrt{10}}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{16} & 0 & \frac{\sqrt{6}}{336} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}}{42} & 0 & \frac{\sqrt{6}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{28} & 0 & -\frac{13}{56} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{15}}{84} & 0 & \frac{\sqrt{35}}{56} \end{bmatrix}$
642	symmetry	$\frac{\sqrt{10}xz\left(3x^2+3y^2-4z^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{4,2}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} \frac{\sqrt{6}i}{336} & 0 & -\frac{\sqrt{15}i}{168} & 0 & 0 & 0 & 0 & \frac{3i}{28} & 0 & -\frac{\sqrt{5}i}{14} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{112} & 0 & \frac{\sqrt{5}i}{56} & 0 & 0 & 0 & 0 & -\frac{i}{7} & 0 & \frac{\sqrt{15}i}{84} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}i}{56} & 0 & -\frac{\sqrt{10}i}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{84} & 0 & \frac{i}{7} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{168} & 0 & \frac{\sqrt{6}i}{336} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{14} & 0 & -\frac{3i}{28} & 0 \\ 0 & \frac{\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{56} & 0 & \frac{5\sqrt{15}i}{84} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}i}{42} & 0 & -\frac{\sqrt{15}i}{42} & 0 & 0 & 0 & 0 & \frac{13i}{56} & 0 & -\frac{\sqrt{5}i}{28} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{336} & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 & -\frac{\sqrt{6}i}{336} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}i}{42} & 0 & -\frac{\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{28} & 0 & \frac{13i}{56} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{15}i}{84} & 0 & -\frac{\sqrt{35}i}{56} \end{bmatrix}$
643	symmetry	$\frac{\sqrt{35}\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$
	$\mathbb{G}_{4,1}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
644	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{4,2}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
645	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$
	$\mathbb{G}_{4,1}^{(1,-1;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{30}i}{168} & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & \frac{3\sqrt{10}i}{56} & 0 & 0 & 0 \\ -\frac{i}{56} & 0 & 0 & 0 & -\frac{\sqrt{5}i}{56} & 0 & 0 & -\frac{11\sqrt{6}i}{168} & 0 & 0 & 0 & \frac{\sqrt{2}i}{56} & 0 & 0 \\ 0 & \frac{\sqrt{5}i}{56} & 0 & 0 & 0 & \frac{i}{56} & 0 & 0 & \frac{\sqrt{2}i}{56} & 0 & 0 & 0 & -\frac{11\sqrt{6}i}{168} & 0 \\ 0 & 0 & -\frac{\sqrt{30}i}{168} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}i}{56} & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} \\ 0 & 0 & -\frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{2}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{84} & 0 & 0 & \frac{3\sqrt{14}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{10}i}{56} & 0 & 0 & 0 \\ -\frac{\sqrt{6}i}{28} & 0 & 0 & 0 & \frac{\sqrt{30}i}{84} & 0 & 0 & -\frac{9i}{56} & 0 & 0 & 0 & \frac{17\sqrt{3}i}{168} & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{84} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{28} & 0 & 0 & -\frac{17\sqrt{3}i}{168} & 0 & 0 & 0 & \frac{9i}{56} & 0 \\ 0 & 0 & \frac{\sqrt{30}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{56} & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{56} \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{2}i}{28} & 0 & 0 & 0 \end{bmatrix}$
646	symmetry	$\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{4,2}^{(1,-1;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{30}}{168} & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & -\frac{3\sqrt{10}}{56} & 0 & 0 & 0 \\ -\frac{1}{56} & 0 & 0 & 0 & \frac{\sqrt{5}}{56} & 0 & 0 & -\frac{11\sqrt{6}}{168} & 0 & 0 & 0 & -\frac{\sqrt{2}}{56} & 0 & 0 \\ 0 & \frac{\sqrt{5}}{56} & 0 & 0 & 0 & -\frac{1}{56} & 0 & 0 & \frac{\sqrt{2}}{56} & 0 & 0 & 0 & \frac{11\sqrt{6}}{168} & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{56} & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} \\ 0 & 0 & \frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{2}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{84} & 0 & 0 & \frac{3\sqrt{14}}{56} & 0 & 0 & 0 & \frac{\sqrt{10}}{56} & 0 & 0 & 0 \\ -\frac{\sqrt{6}}{28} & 0 & 0 & 0 & -\frac{\sqrt{30}}{84} & 0 & 0 & -\frac{9}{56} & 0 & 0 & 0 & -\frac{17\sqrt{3}}{168} & 0 & 0 \\ 0 & \frac{\sqrt{30}}{84} & 0 & 0 & 0 & \frac{\sqrt{6}}{28} & 0 & 0 & -\frac{17\sqrt{3}}{168} & 0 & 0 & 0 & -\frac{9}{56} & 0 \\ 0 & 0 & \frac{\sqrt{30}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{56} & 0 & 0 & 0 & \frac{3\sqrt{14}}{56} \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{2}}{28} & 0 & 0 & 0 \end{bmatrix}$
647	symmetry	$\frac{\sqrt{462}xy\left(x^2-3y^2\right)\left(3x^2-y^2\right)}{16}$
	$\mathbb{G}_{6}^{(1,-1;a)}(A_1,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
648	symmetry	$-\frac{\sqrt{210}xz\left(x^2-3y^2\right)\left(3x^2+3y^2-8z^2\right)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_6^{(1,-1;a)}(A_1,2)$	$\begin{bmatrix} 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&\frac{\sqrt{77}i}{44}&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&-\frac{\sqrt{231}i}{44}&0&0\\ 0&0&0&0&0&0&-\frac{\sqrt{22}i}{44}&0&0&0&0&0&\frac{\sqrt{154}i}{44}&0\\ 0&0&0&0&0&0&0&\frac{\sqrt{154}i}{44}&0&0&0&0&0&-\frac{\sqrt{22}i}{44}\\ 0&0&0&0&0&0&0&0&-\frac{\sqrt{231}i}{44}&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&\frac{\sqrt{77}i}{44}&0&0&0&0 \end{bmatrix}$
649	symmetry	$-\frac{5x^6}{16}-\frac{15x^4y^2}{16}+\frac{45x^4z^2}{8}-\frac{15x^2y^4}{16}+\frac{45x^2y^2z^2}{4}-\frac{15x^2z^4}{2}-\frac{5y^6}{16}+\frac{45y^4z^2}{8}-\frac{15y^2z^4}{2}+z^6$
	$\mathbb{G}_6^{(1,-1;a)}(A_2,1)$	$\begin{bmatrix} 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&\frac{\sqrt{66}i}{132}&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&-\frac{\sqrt{110}i}{44}&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&\frac{5\sqrt{33}i}{66}&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&-\frac{5\sqrt{33}i}{66}&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&\frac{\sqrt{110}i}{44}&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&-\frac{\sqrt{66}i}{132}&0 \end{bmatrix}$
650	symmetry	$\frac{\sqrt{462}(x-y)(x+y)\left(x^2-4xy+y^2\right)\left(x^2+4xy+y^2\right)}{32}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_6^{(1,-1;a)}(A_2,2)$	$\begin{bmatrix} 0&0&0&0&0&0&0&0&0&0&0&0&0&0 \\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0 \\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0 \\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0 \\ 0&0&0&0&0&0&0&0&0&0&0&0&0&\frac{i}{2} \\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0 \\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0 \\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0 \\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0 \\ 0&0&0&0&0&0&-\frac{i}{2}&0&0&0&0&0&0&0 \end{bmatrix}$
651	symmetry	$-\frac{\sqrt{210}yz\left(3x^2-y^2\right)\left(3x^2+3y^2-8z^2\right)}{16}$
	$\mathbb{G}_6^{(1,-1;a)}(A_2,3)$	$\begin{bmatrix} 0&0&0&0&0&0&0&0&0&0&0&0&0&0 \\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0 \\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0 \\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0 \\ 0&0&0&0&0&0&0&0&0&0&\frac{\sqrt{77}}{44}&0&0&0 \\ 0&0&0&0&0&0&0&0&0&0&0&-\frac{\sqrt{231}}{44}&0&0 \\ 0&0&0&0&0&0&\frac{\sqrt{22}}{44}&0&0&0&0&0&\frac{\sqrt{154}}{44}&0 \\ 0&0&0&0&0&0&0&-\frac{\sqrt{154}}{44}&0&0&0&0&0&-\frac{\sqrt{22}}{44} \\ 0&0&0&0&0&0&0&0&\frac{\sqrt{231}}{44}&0&0&0&0&0 \\ 0&0&0&0&0&0&0&0&0&-\frac{\sqrt{77}}{44}&0&0&0&0 \end{bmatrix}$
652	symmetry	$\frac{3\sqrt{154}yz\left(5x^4-10x^2y^2+y^4\right)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{6,1}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{12} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
653	symmetry	$\frac{3\sqrt{154}xz\left(x^4-10x^2y^2+5y^4\right)}{16}$
	$\mathbb{G}_{6,2}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
654	symmetry	$\frac{\sqrt{21}yz\left(5x^4+10x^2y^2-20x^2z^2+5y^4-20y^2z^2+8z^4\right)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{6,1}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{264} & 0 & \frac{\sqrt{462}}{264} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}}{264} & 0 & -\frac{5\sqrt{154}}{264} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{132} & 0 & \frac{5\sqrt{77}}{132} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{77}}{132} & 0 & -\frac{\sqrt{1155}}{132} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{154}}{264} & 0 & \frac{\sqrt{770}}{264} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{462}}{264} & 0 & -\frac{\sqrt{22}}{264} \end{bmatrix}$
655	symmetry	$-\frac{\sqrt{21}xz\left(5x^4+10x^2y^2-20x^2z^2+5y^4-20y^2z^2+8z^4\right)}{8}$
	$\mathbb{G}_{6,2}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}i}{264} & 0 & -\frac{\sqrt{462}i}{264} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}i}{264} & 0 & \frac{5\sqrt{154}i}{264} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}i}{132} & 0 & -\frac{5\sqrt{77}i}{132} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{77}i}{132} & 0 & \frac{\sqrt{1155}i}{132} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{154}i}{264} & 0 & -\frac{\sqrt{770}i}{264} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{462}i}{264} & 0 & \frac{\sqrt{22}i}{264} \end{bmatrix}$
656	symmetry	$-\frac{3\sqrt{7}\left(x^2+y^2-10z^2\right)\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{6,1}^{(1,-1;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}i}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{132} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}i}{66} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}i}{132} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}i}{44} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
657	symmetry	$-\frac{3\sqrt{7}xy(x-y)(x+y)\left(x^2+y^2-10z^2\right)}{4}$
	$\mathbb{G}_{6,2}^{(1,-1;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{132} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{66} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{132} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}}{44} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
658	symmetry	$\frac{\sqrt{210}(x-y)(x+y)\left(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4\right)}{32}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{6,1}^{(1,-1;a)}(E,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}i}{66} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}i}{66} & 0 & 0 & 0 & -\frac{\sqrt{385}i}{66} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}i}{66} & 0 & 0 & 0 & \frac{\sqrt{462}i}{66} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{462}i}{66} & 0 & 0 & 0 & -\frac{\sqrt{154}i}{66} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{385}i}{66} & 0 & 0 & 0 & \frac{\sqrt{11}i}{66} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}i}{66} & 0 & 0 & 0 \end{bmatrix}$
659	symmetry	$-\frac{\sqrt{210}xy\left(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4\right)}{16}$
	$\mathbb{G}_{6,2}^{(1,-1;a)}(E,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}}{66} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}}{66} & 0 & 0 & 0 & \frac{\sqrt{385}}{66} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}}{66} & 0 & 0 & 0 & -\frac{\sqrt{462}}{66} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{462}}{66} & 0 & 0 & 0 & \frac{\sqrt{154}}{66} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{385}}{66} & 0 & 0 & 0 & -\frac{\sqrt{11}}{66} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}}{66} & 0 & 0 & 0 \end{bmatrix}$
660	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_2^{(1,0;a)}(A_2)$	$\begin{bmatrix} 0 & \frac{\sqrt{15}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{30}i}{70} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{30}i}{70} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{14} & 0 & 0 \\ -\frac{\sqrt{15}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{2\sqrt{15}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{70} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{2\sqrt{15}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{70} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{28} & 0 \end{bmatrix}$
661	symmetry	$\sqrt{3}yz$
	$\mathbb{G}_{2,1}^{(1,0;a)}(E,1)$	$\begin{bmatrix} \frac{1}{14} & 0 & \frac{3\sqrt{10}}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{14} & 0 & -\frac{\sqrt{30}}{70} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{210} & 0 & \frac{\sqrt{30}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{14} & 0 & -\frac{3\sqrt{10}}{70} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{84} & 0 & \frac{\sqrt{15}}{210} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{70} & 0 & -\frac{\sqrt{6}}{14} & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{10}}{140} & 0 & -\frac{1}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{70} & 0 & -\frac{\sqrt{6}}{14} & 0 \\ 0 & -\frac{3}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{10}}{56} & 0 & 0 & 0 & 0 & 0 \\ \frac{3}{14} & 0 & -\frac{3\sqrt{10}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{168} & 0 & -\frac{11\sqrt{30}}{840} & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{10}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{28} & 0 & -\frac{\sqrt{15}}{60} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{60} & 0 & -\frac{1}{28} & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{10}}{70} & 0 & \frac{3}{14} & 0 & 0 & 0 & 0 & \frac{11\sqrt{30}}{840} & 0 & \frac{\sqrt{6}}{168} & 0 \\ 0 & 0 & 0 & 0 & -\frac{3}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{56} & 0 & \frac{\sqrt{210}}{168} \end{bmatrix}$
662	symmetry	$-\sqrt{3}xz$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{2,2}^{(1,0;a)}(E,1)$	$\begin{bmatrix} \frac{i}{14} & 0 & -\frac{3\sqrt{10}i}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{14} & 0 & \frac{\sqrt{30}i}{70} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{210} & 0 & -\frac{\sqrt{30}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{14} & 0 & \frac{3\sqrt{10}i}{70} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{30}i}{84} & 0 & -\frac{\sqrt{15}i}{210} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{70} & 0 & \frac{\sqrt{6}i}{14} & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{10}i}{140} & 0 & \frac{i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{70} & 0 & \frac{\sqrt{6}i}{14} & 0 \\ 0 & \frac{3i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{168} & 0 & \frac{\sqrt{10}i}{56} & 0 & 0 & 0 & 0 & 0 \\ \frac{3i}{14} & 0 & \frac{3\sqrt{10}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{168} & 0 & \frac{11\sqrt{30}i}{840} & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{10}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{28} & 0 & \frac{\sqrt{15}i}{60} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{60} & 0 & \frac{i}{28} & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{10}i}{70} & 0 & -\frac{3i}{14} & 0 & 0 & 0 & 0 & \frac{11\sqrt{30}i}{840} & 0 & -\frac{\sqrt{6}i}{168} & 0 \\ 0 & 0 & 0 & 0 & -\frac{3i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{56} & 0 & -\frac{\sqrt{210}i}{168} \end{bmatrix}$
663	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{G}_{2,1}^{(1,0;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{10}i}{70} & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{140} & 0 & 0 & 0 \\ -\frac{\sqrt{3}i}{21} & 0 & 0 & 0 & \frac{2\sqrt{15}i}{105} & 0 & 0 & -\frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{28} & 0 & 0 \\ 0 & -\frac{2\sqrt{15}i}{105} & 0 & 0 & 0 & \frac{\sqrt{3}i}{21} & 0 & 0 & -\frac{\sqrt{6}i}{28} & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{28} & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{140} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} \\ 0 & 0 & -\frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{9\sqrt{10}i}{140} & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{105} & 0 & 0 & 0 \\ -\frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & -\frac{9\sqrt{10}i}{140} & 0 & 0 & \frac{\sqrt{3}i}{21} & 0 & 0 & 0 & -\frac{i}{14} & 0 & 0 \\ 0 & -\frac{9\sqrt{10}i}{140} & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{28} & 0 & 0 & \frac{i}{14} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{21} & 0 \\ 0 & 0 & -\frac{9\sqrt{10}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{105} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} \\ 0 & 0 & 0 & -\frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{84} & 0 & 0 & 0 \end{bmatrix}$
664	symmetry	$-\sqrt{3}xy$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{2,2}^{(1,0;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{10}}{70} & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & \frac{\sqrt{30}}{140} & 0 & 0 & 0 \\ -\frac{\sqrt{3}}{21} & 0 & 0 & 0 & -\frac{2\sqrt{15}}{105} & 0 & 0 & -\frac{3\sqrt{2}}{28} & 0 & 0 & 0 & \frac{\sqrt{6}}{28} & 0 & 0 \\ 0 & -\frac{2\sqrt{15}}{105} & 0 & 0 & 0 & -\frac{\sqrt{3}}{21} & 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & 0 & 0 & \frac{3\sqrt{2}}{28} & 0 \\ 0 & 0 & -\frac{\sqrt{10}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{140} & 0 & 0 & 0 & \frac{\sqrt{42}}{28} \\ 0 & 0 & \frac{3\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{9\sqrt{10}}{140} & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 & \frac{\sqrt{30}}{105} & 0 & 0 & 0 \\ -\frac{3\sqrt{2}}{28} & 0 & 0 & 0 & \frac{9\sqrt{10}}{140} & 0 & 0 & \frac{\sqrt{3}}{21} & 0 & 0 & 0 & \frac{1}{14} & 0 & 0 \\ 0 & -\frac{9\sqrt{10}}{140} & 0 & 0 & 0 & \frac{3\sqrt{2}}{28} & 0 & 0 & \frac{1}{14} & 0 & 0 & 0 & \frac{\sqrt{3}}{21} & 0 \\ 0 & 0 & -\frac{9\sqrt{10}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{105} & 0 & 0 & 0 & \frac{\sqrt{42}}{84} \\ 0 & 0 & 0 & -\frac{3\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{84} & 0 & 0 & 0 \end{bmatrix}$
665	symmetry	$\frac{\sqrt{70}xz\left(x^2-3y^2\right)}{4}$
	$\mathbb{G}_{4}^{(1,0;a)}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{27\sqrt{35}i}{700} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{560} & \frac{9\sqrt{5}i}{100} & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{35}i}{350} & 0 \\ \frac{\sqrt{210}i}{560} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{35}i}{350} & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{5}i}{100} \\ 0 & -\frac{\sqrt{14}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{27\sqrt{35}i}{700} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{280} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{200} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}i}{70} & -\frac{3\sqrt{30}i}{400} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{2800} & 0 \\ \frac{3\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{2800} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{30}i}{400} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{200} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{280} & 0 & 0 & 0 & 0 \end{bmatrix}$
666	symmetry	$\frac{3x^4}{8}+\frac{3x^2y^2}{4}-3x^2z^2+\frac{3y^4}{8}-3y^2z^2+z^4$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_4^{(1,0;a)}(A_2,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{5}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{27\sqrt{2}i}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{10}i}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{10}i}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{27\sqrt{2}i}{140} & 0 & 0 \\ \frac{3\sqrt{5}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{9\sqrt{5}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{35} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{5}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{5}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{9\sqrt{5}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{35} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{140} & 0 \end{bmatrix}$
667	symmetry	$\frac{\sqrt{70}yz\left(3x^2-y^2\right)}{4}$
	$\mathbb{G}_4^{(1,0;a)}(A_2,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{27\sqrt{35}}{700} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{560} & -\frac{9\sqrt{5}}{100} & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{35}}{350} & 0 \\ -\frac{\sqrt{210}}{560} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{35}}{350} & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{5}}{100} \\ 0 & \frac{\sqrt{14}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{27\sqrt{35}}{700} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{280} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{200} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}}{70} & \frac{3\sqrt{30}}{400} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{2800} & 0 \\ -\frac{3\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{2800} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{30}}{400} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{200} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{280} & 0 & 0 & 0 & 0 \end{bmatrix}$
668	symmetry	$-\frac{\sqrt{10}yz\left(3x^2+3y^2-4z^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{4,1}^{(1,0;a)}(E,1)$	$\begin{bmatrix} -\frac{\sqrt{10}}{560} & 0 & -\frac{1}{56} & 0 & 0 & 0 & 0 & \frac{27\sqrt{15}}{700} & 0 & \frac{9\sqrt{3}}{70} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{112} & 0 & \frac{\sqrt{3}}{56} & 0 & 0 & 0 & 0 & -\frac{9\sqrt{15}}{175} & 0 & -\frac{9}{140} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{56} & 0 & -\frac{\sqrt{6}}{112} & 0 & 0 & 0 & 0 & -\frac{9}{140} & 0 & -\frac{9\sqrt{15}}{175} & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{56} & 0 & \frac{\sqrt{10}}{560} & 0 & 0 & 0 & 0 & \frac{9\sqrt{3}}{70} & 0 & \frac{27\sqrt{15}}{700} & 0 \\ 0 & \frac{3\sqrt{10}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{280} & 0 & \frac{1}{28} & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{10}}{70} & 0 & -\frac{3}{14} & 0 & 0 & 0 & 0 & -\frac{13\sqrt{15}}{1400} & 0 & -\frac{\sqrt{3}}{140} & 0 & 0 & 0 & 0 \\ 0 & \frac{3}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{2800} & 0 & -\frac{\sqrt{6}}{80} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{80} & 0 & -\frac{\sqrt{10}}{2800} & 0 & 0 \\ 0 & 0 & 0 & -\frac{3}{14} & 0 & -\frac{3\sqrt{10}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{140} & 0 & \frac{13\sqrt{15}}{1400} & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{28} & 0 & -\frac{\sqrt{21}}{280} \end{bmatrix}$
669	symmetry	$\frac{\sqrt{10}xz\left(3x^2+3y^2-4z^2\right)}{4}$
	$\mathbb{G}_{4,2}^{(1,0;a)}(E,1)$	$\begin{bmatrix} -\frac{\sqrt{10}i}{560} & 0 & \frac{i}{56} & 0 & 0 & 0 & 0 & \frac{27\sqrt{15}i}{700} & 0 & -\frac{9\sqrt{3}i}{70} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{112} & 0 & -\frac{\sqrt{3}i}{56} & 0 & 0 & 0 & 0 & -\frac{9\sqrt{15}i}{175} & 0 & \frac{9i}{140} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{56} & 0 & \frac{\sqrt{6}i}{112} & 0 & 0 & 0 & 0 & -\frac{9i}{140} & 0 & \frac{9\sqrt{15}i}{175} & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{56} & 0 & -\frac{\sqrt{10}i}{560} & 0 & 0 & 0 & 0 & \frac{9\sqrt{3}i}{70} & 0 & -\frac{27\sqrt{15}i}{700} & 0 \\ 0 & -\frac{3\sqrt{10}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{280} & 0 & -\frac{i}{28} & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{10}i}{70} & 0 & \frac{3i}{14} & 0 & 0 & 0 & 0 & -\frac{13\sqrt{15}i}{1400} & 0 & \frac{\sqrt{3}i}{140} & 0 & 0 & 0 & 0 \\ 0 & \frac{3i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{2800} & 0 & \frac{\sqrt{6}i}{80} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{80} & 0 & \frac{\sqrt{10}i}{2800} & 0 & 0 \\ 0 & 0 & 0 & -\frac{3i}{14} & 0 & \frac{3\sqrt{10}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{140} & 0 & -\frac{13\sqrt{15}i}{1400} & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{10}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{28} & 0 & \frac{\sqrt{21}i}{280} \end{bmatrix}$
670	symmetry	$\frac{\sqrt{35}\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$

continued ...

Table 9

No.	multipole	matrix
671	$\mathbb{G}_{4,1}^{(1,0;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{210}i}{700} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{10}i}{100} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{10}i}{100} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{35}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{210}i}{700} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{350} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{100} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{100} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{350} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{140} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
672	$\mathbb{G}_{4,2}^{(1,0;a)}(E,2)$	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{210}}{700} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{10}}{100} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{10}}{100} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{35}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{210}}{700} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{350} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{100} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{100} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{350} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{140} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
673	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{4,1}^{(1,0;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}i}{56} & 0 & 0 & \frac{9\sqrt{210}i}{1400} & 0 & 0 & 0 & \frac{27\sqrt{6}i}{280} & 0 & 0 & 0 \\ \frac{\sqrt{15}i}{280} & 0 & 0 & 0 & \frac{\sqrt{3}i}{56} & 0 & 0 & -\frac{99\sqrt{10}i}{1400} & 0 & 0 & 0 & \frac{9\sqrt{30}i}{1400} & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{280} & 0 & 0 & \frac{9\sqrt{30}i}{1400} & 0 & 0 & 0 & -\frac{99\sqrt{10}i}{1400} & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{27\sqrt{6}i}{280} & 0 & 0 & 0 & \frac{9\sqrt{210}i}{1400} \\ 0 & 0 & \frac{9\sqrt{10}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{2}i}{28} & 0 & 0 & -\frac{3\sqrt{210}i}{1400} & 0 & 0 & 0 & \frac{\sqrt{6}i}{280} & 0 & 0 & 0 \\ \frac{9\sqrt{10}i}{140} & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{28} & 0 & 0 & \frac{9\sqrt{15}i}{1400} & 0 & 0 & 0 & -\frac{17\sqrt{5}i}{1400} & 0 & 0 \\ 0 & -\frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & \frac{9\sqrt{10}i}{140} & 0 & 0 & \frac{17\sqrt{5}i}{1400} & 0 & 0 & 0 & -\frac{9\sqrt{15}i}{1400} & 0 \\ 0 & 0 & -\frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{280} & 0 & 0 & 0 & \frac{3\sqrt{210}i}{1400} \\ 0 & 0 & 0 & \frac{9\sqrt{10}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{140} & 0 & 0 & 0 \end{bmatrix}$
673	symmetry	$\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$
	$\mathbb{G}_{4,2}^{(1,0;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{2}}{56} & 0 & 0 & \frac{9\sqrt{210}}{1400} & 0 & 0 & 0 & -\frac{27\sqrt{6}}{280} & 0 & 0 & 0 \\ \frac{\sqrt{15}}{280} & 0 & 0 & 0 & -\frac{\sqrt{3}}{56} & 0 & 0 & -\frac{99\sqrt{10}}{1400} & 0 & 0 & 0 & -\frac{9\sqrt{30}}{1400} & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{56} & 0 & 0 & 0 & \frac{\sqrt{15}}{280} & 0 & 0 & \frac{9\sqrt{30}}{1400} & 0 & 0 & 0 & \frac{99\sqrt{10}}{1400} & 0 \\ 0 & 0 & \frac{\sqrt{2}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{27\sqrt{6}}{280} & 0 & 0 & 0 & -\frac{9\sqrt{210}}{1400} \\ 0 & 0 & -\frac{9\sqrt{10}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{2}}{28} & 0 & 0 & -\frac{3\sqrt{210}}{1400} & 0 & 0 & 0 & -\frac{\sqrt{6}}{280} & 0 & 0 & 0 \\ \frac{9\sqrt{10}}{140} & 0 & 0 & 0 & \frac{3\sqrt{2}}{28} & 0 & 0 & \frac{9\sqrt{15}}{1400} & 0 & 0 & 0 & \frac{17\sqrt{5}}{1400} & 0 & 0 \\ 0 & -\frac{3\sqrt{2}}{28} & 0 & 0 & 0 & -\frac{9\sqrt{10}}{140} & 0 & 0 & \frac{17\sqrt{5}}{1400} & 0 & 0 & 0 & \frac{9\sqrt{15}}{1400} & 0 \\ 0 & 0 & -\frac{3\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{280} & 0 & 0 & 0 & -\frac{3\sqrt{210}}{1400} \\ 0 & 0 & 0 & \frac{9\sqrt{10}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{140} & 0 & 0 & 0 \end{bmatrix}$
674	symmetry	1

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_0^{(1,1;a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
675	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{G}_2^{(1,1;a)}(A_2)$	$\begin{bmatrix} 0 & \frac{12i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{2\sqrt{6}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{2}i}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{6}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{2}i}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{12i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{140} & 0 & 0 \\ \frac{3i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{35} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{6i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{3}i}{105} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{6i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{3}i}{105} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{35} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{21} & 0 \end{bmatrix}$
676	symmetry	$\sqrt{3}yz$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{2,1}^{(1,1;a)}(E,1)$	$\begin{bmatrix} \frac{2\sqrt{15}}{35} & 0 & \frac{3\sqrt{6}}{35} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{140} & 0 & -\frac{3\sqrt{2}}{140} & 0 & 0 & 0 & 0 \\ 0 & -\frac{2}{35} & 0 & \frac{\sqrt{2}}{7} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{140} & 0 & -\frac{3\sqrt{6}}{140} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{7} & 0 & \frac{2}{35} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{6}}{140} & 0 & -\frac{3\sqrt{10}}{140} & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{6}}{35} & 0 & -\frac{2\sqrt{15}}{35} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{140} & 0 & -\frac{3\sqrt{10}}{140} & 0 \\ 0 & \frac{3\sqrt{15}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{42} & 0 & -\frac{\sqrt{6}}{42} & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{15}}{70} & 0 & \frac{3\sqrt{6}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{210} & 0 & -\frac{11\sqrt{2}}{210} & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{6}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{105} & 0 & -\frac{1}{15} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{6}}{70} & 0 & 0 & 0 & 0 & \frac{1}{15} & 0 & -\frac{\sqrt{15}}{105} & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{6}}{70} & 0 & -\frac{3\sqrt{15}}{70} & 0 & 0 & 0 & 0 & \frac{11\sqrt{2}}{210} & 0 & \frac{\sqrt{10}}{210} & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{15}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{42} & 0 & \frac{\sqrt{14}}{42} \end{bmatrix}$
677	symmetry	$-\sqrt{3}xz$
	$\mathbb{G}_{2,2}^{(1,1;a)}(E,1)$	$\begin{bmatrix} \frac{2\sqrt{15}i}{35} & 0 & -\frac{3\sqrt{6}i}{35} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{140} & 0 & \frac{3\sqrt{2}i}{140} & 0 & 0 & 0 & 0 \\ 0 & -\frac{2i}{35} & 0 & -\frac{\sqrt{2}i}{7} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{140} & 0 & \frac{3\sqrt{6}i}{140} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{7} & 0 & -\frac{2i}{35} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{6}i}{140} & 0 & \frac{3\sqrt{10}i}{140} & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{6}i}{35} & 0 & \frac{2\sqrt{15}i}{35} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{140} & 0 & \frac{3\sqrt{10}i}{140} & 0 \\ 0 & -\frac{3\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{42} & 0 & \frac{\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{15}i}{70} & 0 & -\frac{3\sqrt{6}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{210} & 0 & \frac{11\sqrt{2}i}{210} & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{6}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{105} & 0 & \frac{i}{15} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{6}i}{70} & 0 & 0 & 0 & 0 & \frac{i}{15} & 0 & \frac{\sqrt{15}i}{105} & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{6}i}{70} & 0 & \frac{3\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & \frac{11\sqrt{2}i}{210} & 0 & -\frac{\sqrt{10}i}{210} & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{42} & 0 & -\frac{\sqrt{14}i}{42} \end{bmatrix}$
678	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{2,1}^{(1,1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{2\sqrt{6}i}{35} & 0 & 0 & -\frac{3\sqrt{70}i}{280} & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{280} & 0 & 0 & 0 \\ -\frac{4\sqrt{5}i}{35} & 0 & 0 & 0 & \frac{8i}{35} & 0 & 0 & -\frac{3\sqrt{30}i}{280} & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{280} & 0 & 0 \\ 0 & -\frac{8i}{35} & 0 & 0 & 0 & \frac{4\sqrt{5}i}{35} & 0 & 0 & -\frac{3\sqrt{10}i}{280} & 0 & 0 & 0 & -\frac{3\sqrt{30}i}{280} & 0 \\ 0 & 0 & -\frac{2\sqrt{6}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{280} & 0 & 0 & 0 & -\frac{3\sqrt{70}i}{280} \\ 0 & 0 & \frac{3\sqrt{30}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{105} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{9\sqrt{6}i}{140} & 0 & 0 & \frac{\sqrt{70}i}{105} & 0 & 0 & 0 & -\frac{4\sqrt{2}i}{105} & 0 & 0 & 0 \\ \frac{3\sqrt{30}i}{140} & 0 & 0 & 0 & \frac{9\sqrt{6}i}{140} & 0 & 0 & \frac{4\sqrt{5}i}{105} & 0 & 0 & 0 & -\frac{2\sqrt{15}i}{105} & 0 & 0 \\ 0 & \frac{9\sqrt{6}i}{140} & 0 & 0 & 0 & \frac{3\sqrt{30}i}{140} & 0 & 0 & \frac{2\sqrt{15}i}{105} & 0 & 0 & 0 & -\frac{4\sqrt{5}i}{105} & 0 \\ 0 & 0 & \frac{9\sqrt{6}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{4\sqrt{2}i}{105} & 0 & 0 & 0 & -\frac{\sqrt{70}i}{105} \\ 0 & 0 & 0 & \frac{3\sqrt{30}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{105} & 0 & 0 & 0 \end{bmatrix}$
679	symmetry	$-\sqrt{3}xy$
	$\mathbb{G}_{2,2}^{(1,1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{2\sqrt{6}}{35} & 0 & 0 & -\frac{3\sqrt{70}}{280} & 0 & 0 & 0 & \frac{3\sqrt{2}}{280} & 0 & 0 & 0 \\ -\frac{4\sqrt{5}}{35} & 0 & 0 & 0 & -\frac{8}{35} & 0 & 0 & -\frac{3\sqrt{30}}{280} & 0 & 0 & 0 & \frac{3\sqrt{10}}{280} & 0 & 0 \\ 0 & -\frac{8}{35} & 0 & 0 & 0 & -\frac{4\sqrt{5}}{35} & 0 & 0 & -\frac{3\sqrt{10}}{280} & 0 & 0 & 0 & \frac{3\sqrt{30}}{280} & 0 \\ 0 & 0 & -\frac{2\sqrt{6}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{280} & 0 & 0 & 0 & \frac{3\sqrt{70}}{280} \\ 0 & 0 & -\frac{3\sqrt{30}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{105} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{9\sqrt{6}}{140} & 0 & 0 & \frac{\sqrt{70}}{105} & 0 & 0 & 0 & \frac{4\sqrt{2}}{105} & 0 & 0 & 0 \\ \frac{3\sqrt{30}}{140} & 0 & 0 & 0 & -\frac{9\sqrt{6}}{140} & 0 & 0 & \frac{4\sqrt{5}}{105} & 0 & 0 & 0 & \frac{2\sqrt{15}}{105} & 0 & 0 \\ 0 & \frac{9\sqrt{6}}{140} & 0 & 0 & 0 & -\frac{3\sqrt{30}}{140} & 0 & 0 & \frac{2\sqrt{15}}{105} & 0 & 0 & 0 & \frac{4\sqrt{5}}{105} & 0 \\ 0 & 0 & \frac{9\sqrt{6}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{4\sqrt{2}}{105} & 0 & 0 & 0 & \frac{\sqrt{70}}{105} \\ 0 & 0 & 0 & \frac{3\sqrt{30}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{105} & 0 & 0 & 0 \end{bmatrix}$
680	symmetry	$\frac{\sqrt{70}xz\left(x^2-3y^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_4^{(1,1;a)}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{231}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}i}{700} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{385}i}{70} & \frac{\sqrt{330}i}{300} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}i}{1050} & 0 \\ \frac{\sqrt{385}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{1050} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{300} \\ 0 & -\frac{\sqrt{231}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{700} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2310}i}{420} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{770}i}{770} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}i}{1650} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}i}{420} & -\frac{3\sqrt{55}i}{550} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}i}{3850} & 0 \\ -\frac{\sqrt{2310}i}{420} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}i}{3850} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{55}i}{550} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}i}{1650} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2310}i}{420} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{770}i}{770} & 0 & 0 & 0 & 0 \end{bmatrix}$
681	symmetry	$\frac{3x^4}{8}+\frac{3x^2y^2}{4}-3x^2z^2+\frac{3y^4}{8}-3y^2z^2+z^4$
	$\mathbb{G}_4^{(1,1;a)}(A_2,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{330}i}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{33}i}{70} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{2\sqrt{55}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{210} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{55}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{210} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{330}i}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{33}i}{70} & 0 & 0 \\ -\frac{\sqrt{330}i}{420} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{55}i}{385} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{330}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{8\sqrt{33}i}{1155} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{330}i}{210} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}i}{385} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{330}i}{210} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}i}{385} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{330}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{8\sqrt{33}i}{1155} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{420} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{55}i}{385} & 0 \end{bmatrix}$
682	symmetry	$\frac{\sqrt{70}yz\left(3x^2-y^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_4^{(1,1;a)}(A_2,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{231}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{700} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{385}}{70} & -\frac{\sqrt{330}}{300} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{1050} & 0 \\ -\frac{\sqrt{385}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{1050} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{300} \\ 0 & \frac{\sqrt{231}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{700} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2310}}{420} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{770}}{770} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{1650} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{420} & \frac{3\sqrt{55}}{550} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}}{3850} & 0 \\ \frac{\sqrt{2310}}{420} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{385}}{3850} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{55}}{550} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{1650} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2310}}{420} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}}{770} & 0 & 0 & 0 & 0 \end{bmatrix}$
683	symmetry	$-\frac{\sqrt{10}yz\left(3x^2+3y^2-4z^2\right)}{4}$
	$\mathbb{G}_{4,1}^{(1,1;a)}(E,1)$	$\begin{bmatrix} -\frac{\sqrt{165}}{210} & 0 & -\frac{\sqrt{66}}{42} & 0 & 0 & 0 & 0 & \frac{3\sqrt{110}}{700} & 0 & \frac{\sqrt{22}}{70} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{11}}{14} & 0 & \frac{\sqrt{22}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}}{175} & 0 & -\frac{\sqrt{66}}{420} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{22}}{14} & 0 & -\frac{\sqrt{11}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}}{420} & 0 & -\frac{\sqrt{110}}{175} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{66}}{42} & 0 & \frac{\sqrt{165}}{210} & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{70} & 0 & \frac{3\sqrt{110}}{700} & 0 \\ 0 & -\frac{\sqrt{165}}{210} & 0 & 0 & 0 & 0 & \frac{\sqrt{154}}{770} & 0 & \frac{\sqrt{66}}{231} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{165}}{210} & 0 & \frac{\sqrt{66}}{84} & 0 & 0 & 0 & 0 & -\frac{13\sqrt{110}}{3850} & 0 & -\frac{\sqrt{22}}{385} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{66}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{11550} & 0 & -\frac{\sqrt{11}}{110} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{66}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{11}}{110} & 0 & -\frac{\sqrt{165}}{11550} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{66}}{84} & 0 & \frac{\sqrt{165}}{210} & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{385} & 0 & \frac{13\sqrt{110}}{3850} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{210} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}}{231} & 0 & -\frac{\sqrt{154}}{770} \end{bmatrix}$
684	symmetry	$\frac{\sqrt{10}xz\left(3x^2+3y^2-4z^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{4,2}^{(1,1;a)}(E,1)$	$\begin{bmatrix} -\frac{\sqrt{165}i}{210} & 0 & \frac{\sqrt{66}i}{42} & 0 & 0 & 0 & 0 & \frac{3\sqrt{110}i}{700} & 0 & -\frac{\sqrt{22}i}{70} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{11}i}{14} & 0 & -\frac{\sqrt{22}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}i}{175} & 0 & \frac{\sqrt{66}i}{420} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{22}i}{14} & 0 & \frac{\sqrt{11}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}i}{420} & 0 & \frac{\sqrt{110}i}{175} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{66}i}{42} & 0 & -\frac{\sqrt{165}i}{210} & 0 & 0 & 0 & 0 & \frac{\sqrt{22}i}{70} & 0 & -\frac{3\sqrt{110}i}{700} & 0 \\ 0 & \frac{\sqrt{165}i}{210} & 0 & 0 & 0 & 0 & \frac{\sqrt{154}i}{770} & 0 & -\frac{\sqrt{66}i}{231} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{165}i}{210} & 0 & -\frac{\sqrt{66}i}{84} & 0 & 0 & 0 & 0 & -\frac{13\sqrt{110}i}{3850} & 0 & \frac{\sqrt{22}i}{385} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{66}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}i}{11550} & 0 & \frac{\sqrt{11}i}{110} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{66}i}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{11}i}{110} & 0 & \frac{\sqrt{165}i}{11550} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{66}i}{84} & 0 & -\frac{\sqrt{165}i}{210} & 0 & 0 & 0 & 0 & \frac{\sqrt{22}i}{385} & 0 & -\frac{13\sqrt{110}i}{3850} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{210} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}i}{231} & 0 & \frac{\sqrt{154}i}{770} \end{bmatrix}$
685	symmetry	$\frac{\sqrt{35}\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$
	$\mathbb{G}_{4,1}^{(1,1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{385}i}{350} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}i}{150} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}i}{150} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2310}i}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{385}i}{350} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{420} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{231}i}{1155} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{420} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{4\sqrt{385}i}{1925} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}i}{275} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}i}{275} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2310}i}{420} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{4\sqrt{385}i}{1925} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2310}i}{420} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{231}i}{1155} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
686	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{4,2}^{(1,1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{385}}{350} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{150} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{150} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2310}}{105} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}}{350} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{420} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{231}}{1155} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{420} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{4\sqrt{385}}{1925} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}}{275} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}}{275} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2310}}{420} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{4\sqrt{385}}{1925} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2310}}{420} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{231}}{1155} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
687	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$
	$\mathbb{G}_{4,1}^{(1,1;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{33}i}{21} & 0 & 0 & \frac{\sqrt{385}i}{700} & 0 & 0 & 0 & \frac{3\sqrt{11}i}{140} & 0 & 0 & 0 \\ \frac{\sqrt{110}i}{70} & 0 & 0 & 0 & \frac{\sqrt{22}i}{14} & 0 & 0 & -\frac{11\sqrt{165}i}{2100} & 0 & 0 & 0 & \frac{\sqrt{55}i}{700} & 0 & 0 \\ 0 & -\frac{\sqrt{22}i}{14} & 0 & 0 & 0 & -\frac{\sqrt{110}i}{70} & 0 & 0 & \frac{\sqrt{55}i}{700} & 0 & 0 & 0 & -\frac{11\sqrt{165}i}{2100} & 0 \\ 0 & 0 & \frac{\sqrt{33}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{11}i}{140} & 0 & 0 & 0 & \frac{\sqrt{385}i}{700} \\ 0 & 0 & -\frac{\sqrt{165}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{55}i}{385} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{33}i}{84} & 0 & 0 & -\frac{3\sqrt{385}i}{1925} & 0 & 0 & 0 & \frac{\sqrt{11}i}{385} & 0 & 0 & 0 \\ -\frac{\sqrt{165}i}{140} & 0 & 0 & 0 & \frac{\sqrt{33}i}{84} & 0 & 0 & \frac{9\sqrt{110}i}{3850} & 0 & 0 & 0 & -\frac{17\sqrt{330}i}{11550} & 0 & 0 \\ 0 & \frac{\sqrt{33}i}{84} & 0 & 0 & 0 & -\frac{\sqrt{165}i}{140} & 0 & 0 & \frac{17\sqrt{330}i}{11550} & 0 & 0 & 0 & -\frac{9\sqrt{110}i}{3850} & 0 \\ 0 & 0 & \frac{\sqrt{33}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}i}{385} & 0 & 0 & 0 & \frac{3\sqrt{385}i}{1925} \\ 0 & 0 & 0 & -\frac{\sqrt{165}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{55}i}{385} & 0 & 0 & 0 \end{bmatrix}$
688	symmetry	$\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{4,2}^{(1,1;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{33}}{21} & 0 & 0 & \frac{\sqrt{385}}{700} & 0 & 0 & 0 & -\frac{3\sqrt{11}}{140} & 0 & 0 & 0 \\ \frac{\sqrt{110}}{70} & 0 & 0 & 0 & -\frac{\sqrt{22}}{14} & 0 & 0 & -\frac{11\sqrt{165}}{2100} & 0 & 0 & 0 & -\frac{\sqrt{55}}{700} & 0 & 0 \\ 0 & -\frac{\sqrt{22}}{14} & 0 & 0 & 0 & \frac{\sqrt{110}}{70} & 0 & 0 & \frac{\sqrt{55}}{700} & 0 & 0 & 0 & \frac{11\sqrt{165}}{2100} & 0 \\ 0 & 0 & \frac{\sqrt{33}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{11}}{140} & 0 & 0 & 0 & -\frac{\sqrt{385}}{700} \\ 0 & 0 & \frac{\sqrt{165}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{55}}{385} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{33}}{84} & 0 & 0 & -\frac{3\sqrt{385}}{1925} & 0 & 0 & 0 & -\frac{\sqrt{11}}{385} & 0 & 0 & 0 \\ -\frac{\sqrt{165}}{140} & 0 & 0 & 0 & -\frac{\sqrt{33}}{84} & 0 & 0 & \frac{9\sqrt{110}}{3850} & 0 & 0 & 0 & \frac{17\sqrt{330}}{11550} & 0 & 0 \\ 0 & \frac{\sqrt{33}}{84} & 0 & 0 & 0 & \frac{\sqrt{165}}{140} & 0 & 0 & \frac{17\sqrt{330}}{11550} & 0 & 0 & 0 & \frac{9\sqrt{110}}{3850} & 0 \\ 0 & 0 & \frac{\sqrt{33}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}}{385} & 0 & 0 & 0 & -\frac{3\sqrt{385}}{1925} \\ 0 & 0 & 0 & -\frac{\sqrt{165}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{55}}{385} & 0 & 0 & 0 \end{bmatrix}$
689	symmetry	z
	$\mathbb{T}_1^{(a)}(A_1)$	$\begin{bmatrix} 0 & \frac{i}{5} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{i}{5} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{7} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{7} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{14} & 0 \end{bmatrix}$
690	symmetry	x

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}^{(a)}_{1,1}(E)$	$\begin{bmatrix} -\frac{\sqrt{5}i}{10} & 0 & \frac{\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{10} & 0 & \frac{\sqrt{6}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{20} & 0 & \frac{\sqrt{3}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{20} & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & \frac{\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}i}{70} & 0 & -\frac{\sqrt{2}i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{28} & 0 & \frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{35} & 0 & -\frac{3i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{14} & 0 & \frac{\sqrt{3}i}{14} & 0 & 0 & 0 \\ 0 & 0 & -\frac{3i}{70} & 0 & -\frac{\sqrt{2}i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{14} & 0 & \frac{\sqrt{5}i}{14} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{35} & 0 & -\frac{\sqrt{5}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{28} & 0 & \frac{\sqrt{30}i}{28} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{28} & 0 & \frac{\sqrt{42}i}{28} \end{bmatrix}$
691	symmetry	y
	$\mathbb{T}^{(a)}_{1,2}(E)$	$\begin{bmatrix} \frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{2}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{10} & 0 & \frac{\sqrt{6}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{20} & 0 & \frac{\sqrt{3}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{20} & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & \frac{\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}}{70} & 0 & -\frac{\sqrt{2}}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{28} & 0 & \frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{35} & 0 & -\frac{3}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{14} & 0 & \frac{\sqrt{3}}{14} & 0 & 0 & 0 \\ 0 & 0 & \frac{3}{70} & 0 & -\frac{\sqrt{2}}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{14} & 0 & \frac{\sqrt{5}}{14} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{35} & 0 & -\frac{\sqrt{5}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{28} & 0 & \frac{\sqrt{30}}{28} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{28} & 0 & \frac{\sqrt{42}}{28} \end{bmatrix}$
692	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_3^{(a)}(A_1,1)$	$\begin{bmatrix} 0 & -\frac{3\sqrt{21}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{14}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{14}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{21}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 \\ \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}i}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{2\sqrt{21}i}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{2\sqrt{21}i}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{14} & 0 \end{bmatrix}$
693	symmetry	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$
	$\mathbb{T}_3^{(a)}(A_1,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{3\sqrt{210}}{280} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{56} & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 \\ -\frac{3\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} \\ 0 & -\frac{3\sqrt{210}}{280} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{105} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{56} & 0 \\ -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} \\ 0 & -\frac{\sqrt{210}}{105} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 \end{bmatrix}$
694	symmetry	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}^{(a)}_{3}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{3\sqrt{210}i}{280} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{56} & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 \\ \frac{3\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} \\ 0 & \frac{3\sqrt{210}i}{280} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{105} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{56} & 0 \\ \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} \\ 0 & \frac{\sqrt{210}i}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 \end{bmatrix}$
695	symmetry	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{T}^{(a)}_{3,1}(E,1)$	$\begin{bmatrix} \frac{3\sqrt{70}i}{280} & 0 & -\frac{9\sqrt{7}i}{140} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}i}{40} & 0 & \frac{\sqrt{21}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{21}i}{140} & 0 & \frac{\sqrt{42}i}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{9\sqrt{7}i}{140} & 0 & -\frac{3\sqrt{70}i}{280} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & \frac{\sqrt{105}i}{84} & 0 \\ 0 & \frac{\sqrt{70}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{70}i}{70} & 0 & -\frac{\sqrt{7}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}i}{70} & 0 & -\frac{\sqrt{14}i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & \frac{\sqrt{42}i}{168} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{14}i}{35} & 0 & -\frac{\sqrt{7}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{168} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}i}{70} & 0 & \frac{\sqrt{70}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & \frac{\sqrt{105}i}{84} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & -\frac{\sqrt{3}i}{12} \end{bmatrix}$
696	symmetry	$-\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}^{(a)}_{3,2}(E,1)$	$\begin{bmatrix} -\frac{3\sqrt{70}}{280} & 0 & -\frac{9\sqrt{7}}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}}{40} & 0 & \frac{\sqrt{21}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}}{140} & 0 & \frac{\sqrt{42}}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{9\sqrt{7}}{140} & 0 & -\frac{3\sqrt{70}}{280} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & \frac{\sqrt{105}}{84} & 0 \\ 0 & \frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{70}}{70} & 0 & -\frac{\sqrt{7}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{7}}{70} & 0 & -\frac{\sqrt{14}}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{42}}{168} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{14}}{35} & 0 & -\frac{\sqrt{7}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{168} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}}{70} & 0 & \frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & \frac{\sqrt{105}}{84} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{3}}{12} \end{bmatrix}$
697	symmetry	$\sqrt{15}xyz$
	$\mathbb{T}^{(a)}_{3,1}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{3\sqrt{70}}{140} & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 \\ -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 \\ 0 & \frac{\sqrt{105}}{140} & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 \\ 0 & 0 & \frac{3\sqrt{70}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & \frac{\sqrt{6}}{24} \\ 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{70}}{140} & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 \\ -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & -\frac{\sqrt{70}}{140} & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 \\ 0 & -\frac{\sqrt{70}}{140} & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & 0 \\ 0 & 0 & \frac{\sqrt{70}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{42} & 0 & 0 & 0 \end{bmatrix}$
698	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}^{(a)}_{3,2}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{3\sqrt{70}i}{140} & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 \\ \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{105}i}{140} & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 \\ 0 & -\frac{\sqrt{105}i}{140} & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 \\ 0 & 0 & -\frac{3\sqrt{70}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & 0 & \frac{\sqrt{6}i}{24} \\ 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{70}i}{140} & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 \\ \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{70}i}{140} & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 \\ 0 & \frac{\sqrt{70}i}{140} & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 \\ 0 & 0 & -\frac{\sqrt{70}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{42} & 0 & 0 & 0 \end{bmatrix}$
699	symmetry	$\frac{z\left(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4\right)}{8}$
	$\mathbb{T}^{(a)}_{5}(A_1,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{30} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{6}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{15}i}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{14} & 0 \end{bmatrix}$
700	symmetry	$-\frac{\sqrt{70}y\left(3x^2-y^2\right)\left(x^2+y^2-8z^2\right)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_5^{(a)}(A_1,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{30} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{30} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{30} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{30} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{30} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{30} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & \frac{1}{10} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{70} & 0 \\ \frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{70} & 0 & 0 & 0 & 0 & 0 & \frac{1}{10} \\ 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 \end{bmatrix}$
701	symmetry	$-\frac{\sqrt{70}x\left(x^2-3y^2\right)\left(x^2+y^2-8z^2\right)}{16}$
	$\mathbb{T}_5^{(a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{30} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{30} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{30} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{30} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{30} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{30} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{42} & -\frac{i}{10} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}i}{70} & 0 \\ -\frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{70} & 0 & 0 & 0 & 0 & 0 & \frac{i}{10} \\ 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 \end{bmatrix}$
702	symmetry	$\frac{3\sqrt{14}x\left(x^4-10x^2y^2+5y^4\right)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}^{(a)}_{5,1}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
703	symmetry	$-\frac{3\sqrt{14}y\left(5x^4-10x^2y^2+y^4\right)}{16}$
	$\mathbb{T}^{(a)}_{5,2}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
704	symmetry	$\frac{\sqrt{15}x\left(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4\right)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}^{(a)}_{5,1}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{30} & 0 & \frac{\sqrt{15}i}{30} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{10} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & \frac{\sqrt{3}i}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{30} & 0 & -\frac{\sqrt{3}i}{30} & 0 \\ 0 & -\frac{\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{420} & 0 & \frac{\sqrt{5}i}{28} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{28} & 0 & \frac{\sqrt{5}i}{14} & 0 & 0 & 0 & 0 & \frac{23\sqrt{3}i}{420} & 0 & -\frac{13\sqrt{15}i}{420} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}i}{14} & 0 & -\frac{\sqrt{10}i}{14} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{2}i}{140} & 0 & \frac{\sqrt{30}i}{420} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{14} & 0 & \frac{\sqrt{5}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{420} & 0 & \frac{11\sqrt{2}i}{140} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{14} & 0 & -\frac{\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & \frac{13\sqrt{15}i}{420} & 0 & -\frac{23\sqrt{3}i}{420} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{28} & 0 & \frac{\sqrt{105}i}{420} \end{bmatrix}$
705	symmetry	$\frac{\sqrt{15}y\left(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4\right)}{8}$
	$\mathbb{T}^{(a)}_{5,2}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{30} & 0 & \frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{3}}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & -\frac{\sqrt{3}}{30} & 0 \\ 0 & -\frac{\sqrt{2}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{420} & 0 & \frac{\sqrt{5}}{28} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}}{28} & 0 & \frac{\sqrt{5}}{14} & 0 & 0 & 0 & 0 & -\frac{23\sqrt{3}}{420} & 0 & -\frac{13\sqrt{15}}{420} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}}{14} & 0 & -\frac{\sqrt{10}}{14} & 0 & 0 & 0 & 0 & \frac{11\sqrt{2}}{140} & 0 & \frac{\sqrt{30}}{420} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}}{14} & 0 & \frac{\sqrt{5}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{420} & 0 & \frac{11\sqrt{2}}{140} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{14} & 0 & -\frac{\sqrt{2}}{28} & 0 & 0 & 0 & 0 & -\frac{13\sqrt{15}}{420} & 0 & -\frac{23\sqrt{3}}{420} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{28} & 0 & \frac{\sqrt{105}}{420} \end{bmatrix}$
706	symmetry	$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}^{(a)}_{5,1}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{70} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
707	symmetry	$\frac{3\sqrt{35}z\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$
	$\mathbb{T}^{(a)}_{5,2}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
708	symmetry	$-\frac{\sqrt{105}xyz\left(x^2+y^2-2z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}^{(a)}_{5,1}(E,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{60} & 0 & 0 & 0 & \frac{\sqrt{105}}{60} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{20} & 0 & 0 & 0 & -\frac{\sqrt{21}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{20} & 0 & 0 & 0 & \frac{\sqrt{7}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{60} & 0 & 0 & 0 & -\frac{\sqrt{3}}{60} \\ 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & \frac{\sqrt{3}}{30} & 0 & 0 & 0 & -\frac{\sqrt{105}}{105} & 0 & 0 & 0 \\ \frac{\sqrt{7}}{28} & 0 & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & -\frac{2\sqrt{42}}{105} & 0 & 0 & 0 & -\frac{\sqrt{14}}{70} & 0 & 0 \\ 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & \frac{\sqrt{14}}{70} & 0 & 0 & 0 & \frac{2\sqrt{42}}{105} & 0 \\ 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{105} & 0 & 0 & 0 & -\frac{\sqrt{3}}{30} \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 \end{bmatrix}$
709	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)\left(x^2+y^2-2z^2\right)}{4}$
	$\mathbb{T}^{(a)}_{5,2}(E,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{60} & 0 & 0 & 0 & \frac{\sqrt{105}i}{60} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{20} & 0 & 0 & 0 & -\frac{\sqrt{21}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{20} & 0 & 0 & 0 & \frac{\sqrt{7}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{60} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{60} \\ 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & -\frac{\sqrt{3}i}{30} & 0 & 0 & 0 & -\frac{\sqrt{105}i}{105} & 0 & 0 & 0 \\ -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & \frac{2\sqrt{42}i}{105} & 0 & 0 & 0 & -\frac{\sqrt{14}i}{70} & 0 & 0 \\ 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{14}i}{70} & 0 & 0 & 0 & \frac{2\sqrt{42}i}{105} & 0 \\ 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{105} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{30} \\ 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 \end{bmatrix}$
710	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_3^{(1,-1;a)}(A_1,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{6}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{2i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{2i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{14} & 0 & 0 \\ \frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2i}{7} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{7} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{7} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2i}{7} & 0 \end{bmatrix}$
711	symmetry	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$
	$\mathbb{T}_3^{(1,-1;a)}(A_1,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{1}{14} & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{14} & 0 \\ -\frac{1}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} \\ 0 & -\frac{\sqrt{15}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{28} & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & \frac{3}{14} & 0 \\ -\frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} \\ 0 & -\frac{\sqrt{15}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{14} & 0 & 0 & 0 & 0 \end{bmatrix}$
712	symmetry	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_3^{(1,-1;a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{i}{14} & -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{14} & 0 \\ \frac{i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} \\ 0 & \frac{\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{28} & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & \frac{3i}{14} & 0 \\ \frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3i}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} \\ 0 & \frac{\sqrt{15}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{14} & 0 & 0 & 0 & 0 \end{bmatrix}$
713	symmetry	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{T}_{3,1}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} \frac{\sqrt{5}i}{70} & 0 & -\frac{3\sqrt{2}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{28} & 0 & -\frac{\sqrt{6}i}{14} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{30} & 0 & \frac{\sqrt{6}i}{210} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{210} & 0 & \frac{\sqrt{3}i}{30} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{2}i}{70} & 0 & -\frac{\sqrt{5}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{14} & 0 & \frac{\sqrt{30}i}{28} & 0 \\ 0 & \frac{3\sqrt{5}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{42} & 0 & \frac{\sqrt{2}i}{7} & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{5}i}{70} & 0 & -\frac{3\sqrt{2}i}{140} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{42} & 0 & \frac{\sqrt{6}i}{21} & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{2}i}{140} & 0 & -\frac{3i}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{14} & 0 & -\frac{\sqrt{3}i}{42} & 0 & 0 & 0 \\ 0 & 0 & -\frac{3i}{35} & 0 & -\frac{3\sqrt{2}i}{140} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{42} & 0 & -\frac{\sqrt{5}i}{14} & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{2}i}{140} & 0 & \frac{3\sqrt{5}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{21} & 0 & -\frac{\sqrt{30}i}{42} & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{5}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{7} & 0 & \frac{\sqrt{42}i}{42} \end{bmatrix}$
714	symmetry	$-\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}^{(1,-1;a)}_{3,2}(E,1)$	$\begin{bmatrix} -\frac{\sqrt{5}}{70} & 0 & -\frac{3\sqrt{2}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{28} & 0 & -\frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{30} & 0 & \frac{\sqrt{6}}{210} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{210} & 0 & \frac{\sqrt{3}}{30} & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{2}}{70} & 0 & -\frac{\sqrt{5}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{14} & 0 & \frac{\sqrt{30}}{28} & 0 \\ 0 & \frac{3\sqrt{5}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{42} & 0 & \frac{\sqrt{2}}{7} & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{5}}{70} & 0 & -\frac{3\sqrt{2}}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{42} & 0 & \frac{\sqrt{6}}{21} & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{2}}{140} & 0 & -\frac{3}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{14} & 0 & -\frac{\sqrt{3}}{42} & 0 & 0 & 0 \\ 0 & 0 & \frac{3}{35} & 0 & -\frac{3\sqrt{2}}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{42} & 0 & -\frac{\sqrt{5}}{14} & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{2}}{140} & 0 & \frac{3\sqrt{5}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{21} & 0 & -\frac{\sqrt{30}}{42} & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{7} & 0 & \frac{\sqrt{42}}{42} \end{bmatrix}$
715	symmetry	$\sqrt{15}xyz$
	$\mathbb{T}^{(1,-1;a)}_{3,1}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{5}}{35} & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & -\frac{\sqrt{15}}{28} & 0 & 0 & 0 \\ -\frac{\sqrt{6}}{42} & 0 & 0 & 0 & -\frac{\sqrt{30}}{210} & 0 & 0 & -\frac{3}{28} & 0 & 0 & 0 & -\frac{3\sqrt{3}}{28} & 0 & 0 \\ 0 & \frac{\sqrt{30}}{210} & 0 & 0 & 0 & \frac{\sqrt{6}}{42} & 0 & 0 & -\frac{3\sqrt{3}}{28} & 0 & 0 & 0 & -\frac{3}{28} & 0 \\ 0 & 0 & \frac{\sqrt{5}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{28} & 0 & 0 & 0 & \frac{\sqrt{21}}{28} \\ 0 & 0 & \frac{3}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{3}}{21} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{5}}{140} & 0 & 0 & \frac{\sqrt{21}}{21} & 0 & 0 & 0 & \frac{\sqrt{15}}{21} & 0 & 0 & 0 \\ -\frac{3}{28} & 0 & 0 & 0 & -\frac{3\sqrt{5}}{140} & 0 & 0 & \frac{\sqrt{6}}{42} & 0 & 0 & 0 & \frac{\sqrt{2}}{14} & 0 & 0 \\ 0 & -\frac{3\sqrt{5}}{140} & 0 & 0 & 0 & -\frac{3}{28} & 0 & 0 & -\frac{\sqrt{2}}{14} & 0 & 0 & 0 & -\frac{\sqrt{6}}{42} & 0 \\ 0 & 0 & \frac{3\sqrt{5}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{21} & 0 & 0 & 0 & -\frac{\sqrt{21}}{21} \\ 0 & 0 & 0 & \frac{3}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{3}}{21} & 0 & 0 & 0 \end{bmatrix}$
716	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}^{(1,-1;a)}_{3,2}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{5}i}{35} & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{28} & 0 & 0 & 0 \\ \frac{\sqrt{6}i}{42} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{210} & 0 & 0 & \frac{3i}{28} & 0 & 0 & 0 & -\frac{3\sqrt{3}i}{28} & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{210} & 0 & 0 & 0 & \frac{\sqrt{6}i}{42} & 0 & 0 & \frac{3\sqrt{3}i}{28} & 0 & 0 & 0 & -\frac{3i}{28} & 0 \\ 0 & 0 & -\frac{\sqrt{5}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{28} & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} \\ 0 & 0 & \frac{3i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{3}i}{21} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{5}i}{140} & 0 & 0 & -\frac{\sqrt{21}i}{21} & 0 & 0 & 0 & \frac{\sqrt{15}i}{21} & 0 & 0 & 0 \\ \frac{3i}{28} & 0 & 0 & 0 & -\frac{3\sqrt{5}i}{140} & 0 & 0 & -\frac{\sqrt{6}i}{42} & 0 & 0 & 0 & \frac{\sqrt{2}i}{14} & 0 & 0 \\ 0 & \frac{3\sqrt{5}i}{140} & 0 & 0 & 0 & -\frac{3i}{28} & 0 & 0 & \frac{\sqrt{2}i}{14} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{42} & 0 \\ 0 & 0 & -\frac{3\sqrt{5}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{21} & 0 & 0 & 0 & -\frac{\sqrt{21}i}{21} \\ 0 & 0 & 0 & -\frac{3i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{3}i}{21} & 0 & 0 & 0 \end{bmatrix}$
717	symmetry	$\frac{z\left(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4\right)}{8}$
	$\mathbb{T}^{(1,-1;a)}_{5}(A_1,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{20} & 0 & 0 \\ -\frac{\sqrt{5}i}{210} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{2}i}{35} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}i}{35} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}i}{35} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{2}i}{35} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{210} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{35} & 0 \end{bmatrix}$
718	symmetry	$-\frac{\sqrt{70}y\left(3x^2-y^2\right)\left(x^2+y^2-8z^2\right)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_5^{(1,-1;a)}(A_1,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{50} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{50} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{50} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{50} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{50} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{50} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}}{105} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{35} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}}{175} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{105} & -\frac{\sqrt{30}}{25} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{210}}{175} & 0 \\ \frac{\sqrt{35}}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{210}}{175} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{25} \\ 0 & -\frac{\sqrt{14}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}}{175} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{35}}{105} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{35} & 0 & 0 & 0 & 0 \end{bmatrix}$
719	symmetry	$-\frac{\sqrt{70}x\left(x^2-3y^2\right)\left(x^2+y^2-8z^2\right)}{16}$
	$\mathbb{T}_5^{(1,-1;a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{50} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{50} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{50} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{50} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{50} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{50} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}i}{105} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{35} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}i}{175} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{105} & \frac{\sqrt{30}i}{25} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{210}i}{175} & 0 \\ -\frac{\sqrt{35}i}{105} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{210}i}{175} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{25} \\ 0 & \frac{\sqrt{14}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}i}{175} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{35}i}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{35} & 0 & 0 & 0 & 0 \end{bmatrix}$
720	symmetry	$\frac{3\sqrt{14}x\left(x^4-10x^2y^2+5y^4\right)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}^{(1,-1;a)}_{5,1}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{35} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{5} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{5} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{70}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
721	symmetry	$-\frac{3\sqrt{14}y\left(5x^4-10x^2y^2+y^4\right)}{16}$
	$\mathbb{T}^{(1,-1;a)}_{5,2}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{35} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{5} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{5} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{35} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
722	symmetry	$\frac{\sqrt{15}x\left(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4\right)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}^{(1,-1;a)}_{5,1}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{100} & 0 & \frac{\sqrt{2}i}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}i}{100} & 0 & -\frac{\sqrt{6}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{20} & 0 & \frac{3\sqrt{10}i}{100} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{20} & 0 & -\frac{\sqrt{10}i}{100} & 0 \\ 0 & -\frac{\sqrt{15}i}{210} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{70} & 0 & -\frac{\sqrt{6}i}{14} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}i}{210} & 0 & \frac{\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & -\frac{23\sqrt{10}i}{350} & 0 & \frac{13\sqrt{2}i}{70} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{42} & 0 & -\frac{\sqrt{3}i}{21} & 0 & 0 & 0 & 0 & \frac{11\sqrt{15}i}{175} & 0 & -\frac{i}{35} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{21} & 0 & \frac{\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & \frac{i}{35} & 0 & -\frac{11\sqrt{15}i}{175} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{42} & 0 & -\frac{\sqrt{15}i}{210} & 0 & 0 & 0 & 0 & -\frac{13\sqrt{2}i}{70} & 0 & \frac{23\sqrt{10}i}{350} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{210} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{14} & 0 & -\frac{\sqrt{14}i}{70} \end{bmatrix}$
723	symmetry	$\frac{\sqrt{15}y\left(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4\right)}{8}$
	$\mathbb{T}^{(1,-1;a)}_{5,2}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{100} & 0 & \frac{\sqrt{2}}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{100} & 0 & -\frac{\sqrt{6}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{20} & 0 & \frac{3\sqrt{10}}{100} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{20} & 0 & -\frac{\sqrt{10}}{100} & 0 \\ 0 & -\frac{\sqrt{15}}{210} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{70} & 0 & -\frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{15}}{210} & 0 & \frac{\sqrt{6}}{42} & 0 & 0 & 0 & 0 & \frac{23\sqrt{10}}{350} & 0 & \frac{13\sqrt{2}}{70} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{42} & 0 & -\frac{\sqrt{3}}{21} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{15}}{175} & 0 & -\frac{1}{35} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{21} & 0 & \frac{\sqrt{6}}{42} & 0 & 0 & 0 & 0 & -\frac{1}{35} & 0 & -\frac{11\sqrt{15}}{175} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{42} & 0 & -\frac{\sqrt{15}}{210} & 0 & 0 & 0 & 0 & \frac{13\sqrt{2}}{70} & 0 & \frac{23\sqrt{10}}{350} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{210} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{14} & 0 & -\frac{\sqrt{14}}{70} \end{bmatrix}$
724	symmetry	$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}^{(1,-1;a)}_{5,1}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{100} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{100} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{100} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{100} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}}{35} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{175} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}}{25} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{15}}{25} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{175} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{35} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
725	symmetry	$\frac{3\sqrt{35}z\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$
	$\mathbb{T}^{(1,-1;a)}_{5,2}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{100} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{100} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}i}{100} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{100} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{35} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{175} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{15}i}{25} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{15}i}{25} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{175} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{35} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
726	symmetry	$-\frac{\sqrt{105}xyz\left(x^2+y^2-2z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}^{(1,-1;a)}_{5,1}(E,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{200} & 0 & 0 & 0 & \frac{\sqrt{14}}{40} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{200} & 0 & 0 & 0 & -\frac{3\sqrt{70}}{200} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}}{200} & 0 & 0 & 0 & \frac{\sqrt{210}}{200} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{40} & 0 & 0 & 0 & -\frac{\sqrt{10}}{200} \\ 0 & 0 & -\frac{\sqrt{210}}{420} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{35} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & -\frac{\sqrt{10}}{25} & 0 & 0 & 0 & \frac{2\sqrt{14}}{35} & 0 & 0 & 0 \\ \frac{\sqrt{210}}{420} & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & \frac{8\sqrt{35}}{175} & 0 & 0 & 0 & \frac{2\sqrt{105}}{175} & 0 & 0 \\ 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 & \frac{\sqrt{210}}{420} & 0 & 0 & -\frac{2\sqrt{105}}{175} & 0 & 0 & 0 & -\frac{8\sqrt{35}}{175} & 0 \\ 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{14}}{35} & 0 & 0 & 0 & \frac{\sqrt{10}}{25} \\ 0 & 0 & 0 & -\frac{\sqrt{210}}{420} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{35} & 0 & 0 & 0 \end{bmatrix}$
727	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)\left(x^2+y^2-2z^2\right)}{4}$
	$\mathbb{T}^{(1,-1;a)}_{5,2}(E,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{200} & 0 & 0 & 0 & \frac{\sqrt{14}i}{40} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{200} & 0 & 0 & 0 & -\frac{3\sqrt{70}i}{200} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}i}{200} & 0 & 0 & 0 & \frac{\sqrt{210}i}{200} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{40} & 0 & 0 & 0 & -\frac{\sqrt{10}i}{200} \\ 0 & 0 & -\frac{\sqrt{210}i}{420} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{35} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & \frac{\sqrt{10}i}{25} & 0 & 0 & 0 & \frac{2\sqrt{14}i}{35} & 0 & 0 & 0 \\ -\frac{\sqrt{210}i}{420} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & -\frac{8\sqrt{35}i}{175} & 0 & 0 & 0 & \frac{2\sqrt{105}i}{175} & 0 & 0 \\ 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 & \frac{\sqrt{210}i}{420} & 0 & 0 & \frac{2\sqrt{105}i}{175} & 0 & 0 & 0 & -\frac{8\sqrt{35}i}{175} & 0 \\ 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{14}i}{35} & 0 & 0 & 0 & \frac{\sqrt{10}i}{25} \\ 0 & 0 & 0 & \frac{\sqrt{210}i}{420} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{35} & 0 & 0 & 0 \end{bmatrix}$
728	symmetry	z

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_1^{(1,0;a)}(A_1)$	$\begin{bmatrix} 0 & \frac{\sqrt{2}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{2}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{9\sqrt{2}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{2}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{2}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{9\sqrt{2}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{14} & 0 \end{bmatrix}$
729	symmetry	x
	$\mathbb{T}_{1,1}^{(1,0;a)}(E)$	$\begin{bmatrix} -\frac{\sqrt{10}i}{20} & 0 & \frac{i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{20} & 0 & \frac{\sqrt{3}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{20} & 0 & \frac{\sqrt{6}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{i}{20} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{10}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & -\frac{i}{28} & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{10}i}{70} & 0 & -\frac{6i}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{28} & 0 & -\frac{\sqrt{3}i}{28} & 0 & 0 & 0 & 0 \\ 0 & -\frac{6i}{35} & 0 & -\frac{9\sqrt{2}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{28} & 0 & -\frac{\sqrt{6}i}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{9\sqrt{2}i}{70} & 0 & -\frac{6i}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{28} & 0 & -\frac{\sqrt{10}i}{28} & 0 & 0 \\ 0 & 0 & 0 & -\frac{6i}{35} & 0 & -\frac{3\sqrt{10}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{28} & 0 & -\frac{\sqrt{15}i}{28} & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{28} & 0 & -\frac{\sqrt{21}i}{28} \end{bmatrix}$
730	symmetry	y

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_{1,2}^{(1,0;a)}(E)$	$\begin{bmatrix} \frac{\sqrt{10}}{20} & 0 & \frac{1}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{20} & 0 & \frac{\sqrt{3}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{20} & 0 & \frac{\sqrt{6}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{20} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{10}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & -\frac{1}{28} & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{10}}{70} & 0 & -\frac{6}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{28} & 0 & -\frac{\sqrt{3}}{28} & 0 & 0 & 0 & 0 \\ 0 & \frac{6}{35} & 0 & -\frac{9\sqrt{2}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{28} & 0 & -\frac{\sqrt{6}}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{9\sqrt{2}}{70} & 0 & -\frac{6}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & -\frac{\sqrt{10}}{28} & 0 & 0 \\ 0 & 0 & 0 & \frac{6}{35} & 0 & -\frac{3\sqrt{10}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{28} & 0 & -\frac{\sqrt{15}}{28} & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{28} & 0 & -\frac{\sqrt{21}}{28} \end{bmatrix}$
731	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{T}_{3}^{(1,0;a)}(A_1,1)$	$\begin{bmatrix} 0 & -\frac{3\sqrt{7}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 \\ \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{2\sqrt{7}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{2\sqrt{7}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 \end{bmatrix}$
732	symmetry	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_3^{(1,0;a)}(A_1,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}}{560} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{112} & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 \\ -\frac{\sqrt{42}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} \\ 0 & -\frac{3\sqrt{70}}{560} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{168} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{56} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & \frac{\sqrt{6}}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{112} & 0 \\ -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{112} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{48} \\ 0 & -\frac{\sqrt{70}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{168} & 0 & 0 & 0 & 0 \end{bmatrix}$
733	symmetry	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$
	$\mathbb{T}_3^{(1,0;a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}i}{560} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{112} & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 \\ \frac{\sqrt{42}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} \\ 0 & \frac{3\sqrt{70}i}{560} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{168} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{56} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & -\frac{\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{112} & 0 \\ \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{112} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{48} \\ 0 & \frac{\sqrt{70}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{168} & 0 & 0 & 0 & 0 \end{bmatrix}$
734	symmetry	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}^{(1,0;a)}_{3,1}(E,1)$	$\begin{bmatrix} \frac{\sqrt{210}i}{560} & 0 & -\frac{3\sqrt{21}i}{280} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{14}i}{80} & 0 & \frac{\sqrt{7}i}{280} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}i}{280} & 0 & \frac{\sqrt{14}i}{80} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{21}i}{280} & 0 & -\frac{\sqrt{210}i}{560} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & -\frac{\sqrt{35}i}{28} & 0 \\ 0 & \frac{\sqrt{210}i}{70} & 0 & 0 & 0 & 0 & -\frac{i}{24} & 0 & \frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{210}i}{70} & 0 & -\frac{\sqrt{21}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{168} & 0 & \frac{\sqrt{7}i}{84} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}i}{70} & 0 & -\frac{\sqrt{42}i}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{336} & 0 & -\frac{\sqrt{14}i}{336} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}i}{35} & 0 & -\frac{\sqrt{21}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{336} & 0 & -\frac{\sqrt{210}i}{336} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}i}{70} & 0 & \frac{\sqrt{210}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{84} & 0 & -\frac{\sqrt{35}i}{168} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & \frac{i}{24} \end{bmatrix}$
735	symmetry	$-\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{T}^{(1,0;a)}_{3,2}(E,1)$	$\begin{bmatrix} -\frac{\sqrt{210}}{560} & 0 & -\frac{3\sqrt{21}}{280} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{14}}{80} & 0 & \frac{\sqrt{7}}{280} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{7}}{280} & 0 & \frac{\sqrt{14}}{80} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{21}}{280} & 0 & -\frac{\sqrt{210}}{560} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{35}}{28} & 0 \\ 0 & \frac{\sqrt{210}}{70} & 0 & 0 & 0 & 0 & \frac{1}{24} & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{210}}{70} & 0 & -\frac{\sqrt{21}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{168} & 0 & \frac{\sqrt{7}}{84} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}}{70} & 0 & -\frac{\sqrt{42}}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{336} & 0 & -\frac{\sqrt{14}}{336} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}}{35} & 0 & -\frac{\sqrt{21}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{336} & 0 & -\frac{\sqrt{210}}{336} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}}{70} & 0 & \frac{\sqrt{210}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{84} & 0 & -\frac{\sqrt{35}}{168} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & \frac{1}{24} \end{bmatrix}$
736	symmetry	$\sqrt{15}xyz$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_{3,1}^{(1,0;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{210}}{280} & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 \\ -\frac{\sqrt{7}}{56} & 0 & 0 & 0 & -\frac{\sqrt{35}}{280} & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & \frac{3\sqrt{14}}{56} & 0 & 0 \\ 0 & \frac{\sqrt{35}}{280} & 0 & 0 & 0 & \frac{\sqrt{7}}{56} & 0 & 0 & \frac{3\sqrt{14}}{56} & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 \\ 0 & 0 & \frac{\sqrt{210}}{280} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} \\ 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{210}}{140} & 0 & 0 & \frac{\sqrt{2}}{24} & 0 & 0 & 0 & \frac{\sqrt{70}}{168} & 0 & 0 & 0 \\ -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & -\frac{\sqrt{210}}{140} & 0 & 0 & \frac{\sqrt{7}}{168} & 0 & 0 & 0 & \frac{\sqrt{21}}{168} & 0 & 0 \\ 0 & -\frac{\sqrt{210}}{140} & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & -\frac{\sqrt{21}}{168} & 0 & 0 & 0 & -\frac{\sqrt{7}}{168} & 0 \\ 0 & 0 & \frac{\sqrt{210}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{168} & 0 & 0 & 0 & -\frac{\sqrt{2}}{24} \\ 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{84} & 0 & 0 & 0 \end{bmatrix}$
737	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{T}_{3,2}^{(1,0;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{210}i}{280} & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 \\ \frac{\sqrt{7}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{35}i}{280} & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & \frac{3\sqrt{14}i}{56} & 0 & 0 \\ 0 & -\frac{\sqrt{35}i}{280} & 0 & 0 & 0 & \frac{\sqrt{7}i}{56} & 0 & 0 & -\frac{3\sqrt{14}i}{56} & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 \\ 0 & 0 & -\frac{\sqrt{210}i}{280} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} \\ 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{210}i}{140} & 0 & 0 & -\frac{\sqrt{2}i}{24} & 0 & 0 & 0 & \frac{\sqrt{70}i}{168} & 0 & 0 & 0 \\ \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{140} & 0 & 0 & -\frac{\sqrt{7}i}{168} & 0 & 0 & 0 & \frac{\sqrt{21}i}{168} & 0 & 0 \\ 0 & \frac{\sqrt{210}i}{140} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & \frac{\sqrt{21}i}{168} & 0 & 0 & 0 & -\frac{\sqrt{7}i}{168} & 0 \\ 0 & 0 & -\frac{\sqrt{210}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{168} & 0 & 0 & 0 & -\frac{\sqrt{2}i}{24} \\ 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{84} & 0 & 0 & 0 \end{bmatrix}$
738	symmetry	$\frac{z\left(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4\right)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_5^{(1,0;a)}(A_1,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{10} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{10} & 0 & 0 \\ -\frac{\sqrt{5}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{420} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}i}{7} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{210} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{7} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{210} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{420} & 0 \end{bmatrix}$
739	symmetry	$-\frac{\sqrt{70}y\left(3x^2-y^2\right)\left(x^2+y^2-8z^2\right)}{16}$
	$\mathbb{T}_5^{(1,0;a)}(A_1,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{25} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{25} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{25} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{25} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{25} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{25} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{420} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{700} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{35} & -\frac{\sqrt{30}}{300} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{700} & 0 \\ \frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{700} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{300} \\ 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{700} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{420} & 0 & 0 & 0 & 0 \end{bmatrix}$
740	symmetry	$-\frac{\sqrt{70}x\left(x^2-3y^2\right)\left(x^2+y^2-8z^2\right)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}^{(1,0;a)}_{5}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{25} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{25} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{25} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{25} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{25} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{25} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{420} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{700} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{35} & \frac{\sqrt{30}i}{300} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{700} & 0 \\ -\frac{\sqrt{35}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{700} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{300} \\ 0 & \frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{700} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{420} & 0 & 0 & 0 & 0 \end{bmatrix}$
741	symmetry	$\frac{3\sqrt{14}x\left(x^4-10x^2y^2+5y^4\right)}{16}$
	$\mathbb{T}^{(1,0;a)}_{5,1}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{5} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{5} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{420} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{60} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{70}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{420} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
742	symmetry	$-\frac{3\sqrt{14}y\left(5x^4-10x^2y^2+y^4\right)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}^{(1,0;a)}_{5,2}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{5} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{5} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{420} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{60} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{70}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{420} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
743	symmetry	$\frac{\sqrt{15}x\left(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4\right)}{8}$
	$\mathbb{T}^{(1,0;a)}_{5,1}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{50} & 0 & -\frac{\sqrt{2}i}{10} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{50} & 0 & \frac{\sqrt{6}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{10} & 0 & -\frac{3\sqrt{10}i}{50} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{10} & 0 & \frac{\sqrt{10}i}{50} & 0 \\ 0 & -\frac{\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{840} & 0 & -\frac{\sqrt{6}i}{168} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}i}{70} & 0 & \frac{\sqrt{6}i}{14} & 0 & 0 & 0 & 0 & -\frac{23\sqrt{10}i}{4200} & 0 & \frac{13\sqrt{2}i}{840} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{14} & 0 & -\frac{\sqrt{3}i}{7} & 0 & 0 & 0 & 0 & \frac{11\sqrt{15}i}{2100} & 0 & -\frac{i}{420} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{7} & 0 & \frac{\sqrt{6}i}{14} & 0 & 0 & 0 & 0 & \frac{i}{420} & 0 & -\frac{11\sqrt{15}i}{2100} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{14} & 0 & -\frac{\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & -\frac{13\sqrt{2}i}{840} & 0 & \frac{23\sqrt{10}i}{4200} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{168} & 0 & -\frac{\sqrt{14}i}{840} \end{bmatrix}$
744	symmetry	$\frac{\sqrt{15}y\left(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4\right)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_{5,2}^{(1,0;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{50} & 0 & -\frac{\sqrt{2}}{10} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{50} & 0 & \frac{\sqrt{6}}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{10} & 0 & -\frac{3\sqrt{10}}{50} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{10} & 0 & \frac{\sqrt{10}}{50} & 0 \\ 0 & -\frac{\sqrt{15}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{840} & 0 & -\frac{\sqrt{6}}{168} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{15}}{70} & 0 & \frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 & \frac{23\sqrt{10}}{4200} & 0 & \frac{13\sqrt{2}}{840} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{14} & 0 & -\frac{\sqrt{3}}{7} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{15}}{2100} & 0 & -\frac{1}{420} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{7} & 0 & \frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 & -\frac{1}{420} & 0 & -\frac{11\sqrt{15}}{2100} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{14} & 0 & -\frac{\sqrt{15}}{70} & 0 & 0 & 0 & 0 & \frac{13\sqrt{2}}{840} & 0 & \frac{23\sqrt{10}}{4200} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{168} & 0 & -\frac{\sqrt{14}}{840} \end{bmatrix}$
745	$\mathbb{T}_{5,1}^{(1,0;a)}(E,3)$	$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{50} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{50} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{50} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{50} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{2100} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{150} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{150} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{2100} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{140} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
746	symmetry	$\frac{3\sqrt{35}z\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_{5,2}^{(1,0;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{50} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}i}{50} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{50} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{50} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{2100} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{150} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{150} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{2100} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{140} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
747	symmetry	$-\frac{\sqrt{105}xyz\left(x^2+y^2-2z^2\right)}{2}$
	$\mathbb{T}_{5,1}^{(1,0;a)}(E,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{100} & 0 & 0 & 0 & -\frac{\sqrt{14}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{100} & 0 & 0 & 0 & \frac{3\sqrt{70}}{100} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{100} & 0 & 0 & 0 & -\frac{\sqrt{210}}{100} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{20} & 0 & 0 & 0 & \frac{\sqrt{10}}{100} \\ 0 & 0 & -\frac{\sqrt{210}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{420} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & -\frac{\sqrt{10}}{300} & 0 & 0 & 0 & \frac{\sqrt{14}}{210} & 0 & 0 & 0 \\ \frac{\sqrt{210}}{140} & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & \frac{2\sqrt{35}}{525} & 0 & 0 & 0 & \frac{\sqrt{105}}{1050} & 0 & 0 \\ 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & \frac{\sqrt{210}}{140} & 0 & 0 & -\frac{\sqrt{105}}{1050} & 0 & 0 & 0 & -\frac{2\sqrt{35}}{525} & 0 \\ 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{210} & 0 & 0 & 0 & \frac{\sqrt{10}}{300} \\ 0 & 0 & 0 & -\frac{\sqrt{210}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{420} & 0 & 0 & 0 \end{bmatrix}$
748	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)\left(x^2+y^2-2z^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}^{(1,0;a)}_{5,2}(E,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{100} & 0 & 0 & 0 & -\frac{\sqrt{14}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{100} & 0 & 0 & 0 & \frac{3\sqrt{70}i}{100} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}i}{100} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{100} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{20} & 0 & 0 & 0 & \frac{\sqrt{10}i}{100} \\ 0 & 0 & -\frac{\sqrt{210}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{420} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & \frac{\sqrt{10}i}{300} & 0 & 0 & 0 & \frac{\sqrt{14}i}{210} & 0 & 0 & 0 \\ -\frac{\sqrt{210}i}{140} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & -\frac{2\sqrt{35}i}{525} & 0 & 0 & 0 & \frac{\sqrt{105}i}{1050} & 0 & 0 \\ 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & \frac{\sqrt{210}i}{140} & 0 & 0 & \frac{\sqrt{105}i}{1050} & 0 & 0 & 0 & -\frac{2\sqrt{35}i}{525} & 0 \\ 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{210} & 0 & 0 & 0 & \frac{\sqrt{10}i}{300} \\ 0 & 0 & 0 & \frac{\sqrt{210}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{420} & 0 & 0 & 0 \end{bmatrix}$
749	symmetry	z
	$\mathbb{T}^{(1,1;a)}_{1}(A_1)$	$\begin{bmatrix} 0 & -\frac{i}{5} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{i}{5} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{2i}{7} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{6i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{2i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{2i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{6i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{2i}{7} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{28} & 0 \end{bmatrix}$
750	symmetry	x

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_{1,1}^{(1,1;a)}(E)$	$\begin{bmatrix} \frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{10} & 0 & -\frac{\sqrt{6}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{20} & 0 & -\frac{\sqrt{3}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{20} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{2\sqrt{5}i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{2}i}{56} & 0 & 0 & 0 & 0 & 0 \\ -\frac{2\sqrt{5}i}{35} & 0 & -\frac{4\sqrt{2}i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{56} & 0 & \frac{\sqrt{6}i}{56} & 0 & 0 & 0 & 0 \\ 0 & -\frac{4\sqrt{2}i}{35} & 0 & -\frac{6i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{28} & 0 & \frac{\sqrt{3}i}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{6i}{35} & 0 & -\frac{4\sqrt{2}i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{28} & 0 & \frac{\sqrt{5}i}{28} & 0 & 0 \\ 0 & 0 & 0 & -\frac{4\sqrt{2}i}{35} & 0 & -\frac{2\sqrt{5}i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{56} & 0 & \frac{\sqrt{30}i}{56} & 0 \\ 0 & 0 & 0 & 0 & -\frac{2\sqrt{5}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{56} & 0 & \frac{\sqrt{42}i}{56} \end{bmatrix}$
751	symmetry	y
	$\mathbb{T}_{1,2}^{(1,1;a)}(E)$	$\begin{bmatrix} -\frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{2}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{10} & 0 & -\frac{\sqrt{6}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{20} & 0 & -\frac{\sqrt{3}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{20} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{2\sqrt{5}}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{2}}{56} & 0 & 0 & 0 & 0 & 0 \\ \frac{2\sqrt{5}}{35} & 0 & -\frac{4\sqrt{2}}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{56} & 0 & \frac{\sqrt{6}}{56} & 0 & 0 & 0 & 0 \\ 0 & \frac{4\sqrt{2}}{35} & 0 & -\frac{6}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{28} & 0 & \frac{\sqrt{3}}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{6}{35} & 0 & -\frac{4\sqrt{2}}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{28} & 0 & \frac{\sqrt{5}}{28} & 0 & 0 \\ 0 & 0 & 0 & \frac{4\sqrt{2}}{35} & 0 & -\frac{2\sqrt{5}}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{56} & 0 & \frac{\sqrt{30}}{56} & 0 \\ 0 & 0 & 0 & 0 & \frac{2\sqrt{5}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{56} & 0 & \frac{\sqrt{42}}{56} \end{bmatrix}$
752	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_3^{(1,1;a)}(A_1,1)$	$\begin{bmatrix} 0 & \frac{9i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{9i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{28} & 0 & 0 \\ \frac{5i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{2i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{2i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{28} & 0 \end{bmatrix}$
753	symmetry	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$
	$\mathbb{T}_3^{(1,1;a)}(A_1,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{9\sqrt{10}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{15\sqrt{6}}{112} & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{1}{14} & 0 \\ \frac{15\sqrt{6}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} \\ 0 & \frac{9\sqrt{10}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3}{56} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{5}{42} & -\frac{\sqrt{42}}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{6}}{112} & 0 \\ -\frac{5}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{6}}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{112} \\ 0 & -\frac{\sqrt{10}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{5}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{56} & 0 & 0 & 0 & 0 \end{bmatrix}$
754	symmetry	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_3^{(1,1;a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{9\sqrt{10}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{15\sqrt{6}i}{112} & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{i}{14} & 0 \\ -\frac{15\sqrt{6}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} \\ 0 & -\frac{9\sqrt{10}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3i}{56} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{5i}{42} & \frac{\sqrt{42}i}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{6}i}{112} & 0 \\ \frac{5i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{6}i}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{112} \\ 0 & \frac{\sqrt{10}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3i}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{5i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{56} & 0 & 0 & 0 & 0 \end{bmatrix}$
755	symmetry	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$
	$\mathbb{T}_{3,1}^{(1,1;a)}(E,1)$	$\begin{bmatrix} -\frac{3\sqrt{30}i}{112} & 0 & \frac{9\sqrt{3}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{28} & 0 & -\frac{i}{14} & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{2}i}{16} & 0 & -\frac{3i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{3i}{56} & 0 & -\frac{3\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{9\sqrt{3}i}{56} & 0 & \frac{3\sqrt{30}i}{112} & 0 & 0 & 0 & 0 & -\frac{i}{14} & 0 & \frac{\sqrt{5}i}{28} & 0 \\ 0 & \frac{\sqrt{30}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{56} & 0 & -\frac{\sqrt{3}i}{28} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{30}i}{42} & 0 & -\frac{\sqrt{3}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{56} & 0 & -\frac{i}{28} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{42} & 0 & -\frac{\sqrt{6}i}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{112} & 0 & \frac{\sqrt{2}i}{112} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{21} & 0 & -\frac{\sqrt{3}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{112} & 0 & \frac{\sqrt{30}i}{112} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}i}{42} & 0 & \frac{\sqrt{30}i}{42} & 0 & 0 & 0 & 0 & \frac{i}{28} & 0 & \frac{\sqrt{5}i}{56} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{28} & 0 & -\frac{\sqrt{7}i}{56} \end{bmatrix}$
756	symmetry	$-\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}^{(1,1;a)}_{3,2}(E,1)$	$\begin{bmatrix} \frac{3\sqrt{30}}{112} & 0 & \frac{9\sqrt{3}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{28} & 0 & -\frac{1}{14} & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{2}}{16} & 0 & -\frac{3}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{3}{56} & 0 & -\frac{3\sqrt{2}}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{9\sqrt{3}}{56} & 0 & \frac{3\sqrt{30}}{112} & 0 & 0 & 0 & 0 & \frac{1}{14} & 0 & \frac{\sqrt{5}}{28} & 0 \\ 0 & \frac{\sqrt{30}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{56} & 0 & -\frac{\sqrt{3}}{28} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}}{42} & 0 & -\frac{\sqrt{3}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{56} & 0 & -\frac{1}{28} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{42} & 0 & -\frac{\sqrt{6}}{21} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{112} & 0 & \frac{\sqrt{2}}{112} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{21} & 0 & -\frac{\sqrt{3}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{112} & 0 & \frac{\sqrt{30}}{112} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}}{42} & 0 & \frac{\sqrt{30}}{42} & 0 & 0 & 0 & 0 & -\frac{1}{28} & 0 & \frac{\sqrt{5}}{56} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{28} & 0 & -\frac{\sqrt{7}}{56} \end{bmatrix}$
757	symmetry	$\sqrt{15}xyz$
	$\mathbb{T}^{(1,1;a)}_{3,1}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{3\sqrt{30}}{56} & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & -\frac{\sqrt{10}}{56} & 0 & 0 & 0 \\ \frac{15}{56} & 0 & 0 & 0 & \frac{3\sqrt{5}}{56} & 0 & 0 & -\frac{\sqrt{6}}{56} & 0 & 0 & 0 & -\frac{3\sqrt{2}}{56} & 0 & 0 \\ 0 & -\frac{3\sqrt{5}}{56} & 0 & 0 & 0 & -\frac{15}{56} & 0 & 0 & -\frac{3\sqrt{2}}{56} & 0 & 0 & 0 & -\frac{\sqrt{6}}{56} & 0 \\ 0 & 0 & -\frac{3\sqrt{30}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{56} & 0 & 0 & 0 & \frac{\sqrt{14}}{56} \\ 0 & 0 & \frac{5\sqrt{6}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}}{84} & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & -\frac{\sqrt{10}}{56} & 0 & 0 & 0 \\ -\frac{5\sqrt{6}}{84} & 0 & 0 & 0 & -\frac{\sqrt{30}}{84} & 0 & 0 & -\frac{1}{56} & 0 & 0 & 0 & -\frac{\sqrt{3}}{56} & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{84} & 0 & 0 & 0 & -\frac{5\sqrt{6}}{84} & 0 & 0 & \frac{\sqrt{3}}{56} & 0 & 0 & 0 & \frac{1}{56} & 0 \\ 0 & 0 & \frac{\sqrt{30}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{56} & 0 & 0 & 0 & \frac{\sqrt{14}}{56} \\ 0 & 0 & 0 & \frac{5\sqrt{6}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{28} & 0 & 0 & 0 \end{bmatrix}$
758	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}^{(1,1;a)}_{3,2}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{3\sqrt{30}i}{56} & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{10}i}{56} & 0 & 0 & 0 \\ -\frac{15i}{56} & 0 & 0 & 0 & \frac{3\sqrt{5}i}{56} & 0 & 0 & \frac{\sqrt{6}i}{56} & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{56} & 0 & 0 \\ 0 & \frac{3\sqrt{5}i}{56} & 0 & 0 & 0 & -\frac{15i}{56} & 0 & 0 & \frac{3\sqrt{2}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{56} & 0 \\ 0 & 0 & \frac{3\sqrt{30}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{56} & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} \\ 0 & 0 & \frac{5\sqrt{6}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{84} & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{10}i}{56} & 0 & 0 & 0 \\ \frac{5\sqrt{6}i}{84} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{84} & 0 & 0 & \frac{i}{56} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{56} & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{84} & 0 & 0 & 0 & -\frac{5\sqrt{6}i}{84} & 0 & 0 & -\frac{\sqrt{3}i}{56} & 0 & 0 & 0 & \frac{i}{56} & 0 \\ 0 & 0 & -\frac{\sqrt{30}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{56} & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} \\ 0 & 0 & 0 & -\frac{5\sqrt{6}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{28} & 0 & 0 & 0 \end{bmatrix}$
759	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{M}^{(a)}_2(A_2)$	$\begin{bmatrix} 0 & \frac{3\sqrt{10}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}}{70} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}}{70} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{14} & 0 & 0 \\ -\frac{\sqrt{10}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{70} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{70} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{14} & 0 \end{bmatrix}$
760	symmetry	$\sqrt{3}yz$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_{2,1}^{(a)}(E,1)$	$\begin{bmatrix} -\frac{\sqrt{6}i}{14} & 0 & -\frac{3\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & -\frac{i}{14} & 0 & -\frac{\sqrt{5}i}{70} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{70} & 0 & -\frac{\sqrt{5}i}{14} & 0 & 0 & 0 & 0 & -\frac{i}{14} & 0 & -\frac{\sqrt{15}i}{70} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}i}{14} & 0 & -\frac{\sqrt{10}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{70} & 0 & -\frac{i}{14} & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{15}i}{70} & 0 & \frac{\sqrt{6}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{70} & 0 & -\frac{i}{14} & 0 \\ 0 & \frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & -\frac{\sqrt{15}i}{28} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}i}{28} & 0 & \frac{\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & -\frac{i}{28} & 0 & -\frac{11\sqrt{5}i}{140} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{28} & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & -\frac{\sqrt{6}i}{28} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}i}{70} & 0 & -\frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & \frac{11\sqrt{5}i}{140} & 0 & \frac{i}{28} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{28} & 0 & \frac{\sqrt{35}i}{28} \end{bmatrix}$
761	$\mathbb{M}_{2,2}^{(a)}(E,1)$	$-\sqrt{3}xz$ $\begin{bmatrix} \frac{\sqrt{6}}{14} & 0 & -\frac{3\sqrt{15}}{70} & 0 & 0 & 0 & 0 & \frac{1}{14} & 0 & -\frac{\sqrt{5}}{70} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{70} & 0 & -\frac{\sqrt{5}}{14} & 0 & 0 & 0 & 0 & \frac{1}{14} & 0 & -\frac{\sqrt{15}}{70} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{14} & 0 & -\frac{\sqrt{10}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{70} & 0 & -\frac{1}{14} & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{15}}{70} & 0 & \frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{70} & 0 & -\frac{1}{14} & 0 \\ 0 & \frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & -\frac{\sqrt{15}}{28} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}}{28} & 0 & \frac{\sqrt{15}}{70} & 0 & 0 & 0 & 0 & \frac{1}{28} & 0 & -\frac{11\sqrt{5}}{140} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{6}}{28} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{70} & 0 & -\frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{5}}{140} & 0 & \frac{1}{28} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{28} & 0 & \frac{\sqrt{35}}{28} \end{bmatrix}$
762	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_{2,1}^{(a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{15}}{35} & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & \frac{\sqrt{5}}{140} & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{7} & 0 & 0 & 0 & \frac{2\sqrt{10}}{35} & 0 & 0 & \frac{\sqrt{3}}{28} & 0 & 0 & 0 & \frac{1}{28} & 0 & 0 \\ 0 & -\frac{2\sqrt{10}}{35} & 0 & 0 & 0 & \frac{\sqrt{2}}{7} & 0 & 0 & \frac{1}{28} & 0 & 0 & 0 & \frac{\sqrt{3}}{28} & 0 \\ 0 & 0 & -\frac{\sqrt{15}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{140} & 0 & 0 & 0 & \frac{\sqrt{7}}{28} \\ 0 & 0 & -\frac{\sqrt{3}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{15}}{140} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & \frac{2\sqrt{5}}{35} & 0 & 0 & 0 \\ -\frac{\sqrt{3}}{28} & 0 & 0 & 0 & -\frac{3\sqrt{15}}{140} & 0 & 0 & -\frac{\sqrt{2}}{7} & 0 & 0 & 0 & \frac{\sqrt{6}}{14} & 0 & 0 \\ 0 & -\frac{3\sqrt{15}}{140} & 0 & 0 & 0 & -\frac{\sqrt{3}}{28} & 0 & 0 & -\frac{\sqrt{6}}{14} & 0 & 0 & 0 & \frac{\sqrt{2}}{7} & 0 \\ 0 & 0 & -\frac{3\sqrt{15}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{5}}{35} & 0 & 0 & 0 & \frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{14} & 0 & 0 & 0 \end{bmatrix}$
763	symmetry	$-\sqrt{3}xy$
	$\mathbb{M}_{2,2}^{(a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{15}i}{35} & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & \frac{\sqrt{5}i}{140} & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{7} & 0 & 0 & 0 & \frac{2\sqrt{10}i}{35} & 0 & 0 & -\frac{\sqrt{3}i}{28} & 0 & 0 & 0 & \frac{i}{28} & 0 & 0 \\ 0 & \frac{2\sqrt{10}i}{35} & 0 & 0 & 0 & \frac{\sqrt{2}i}{7} & 0 & 0 & -\frac{i}{28} & 0 & 0 & 0 & \frac{\sqrt{3}i}{28} & 0 \\ 0 & 0 & \frac{\sqrt{15}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{140} & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} \\ 0 & 0 & -\frac{\sqrt{3}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{15}i}{140} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & \frac{2\sqrt{5}i}{35} & 0 & 0 & 0 \\ \frac{\sqrt{3}i}{28} & 0 & 0 & 0 & -\frac{3\sqrt{15}i}{140} & 0 & 0 & \frac{\sqrt{2}i}{7} & 0 & 0 & 0 & \frac{\sqrt{6}i}{14} & 0 & 0 \\ 0 & \frac{3\sqrt{15}i}{140} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{28} & 0 & 0 & \frac{\sqrt{6}i}{14} & 0 & 0 & 0 & \frac{\sqrt{2}i}{7} & 0 \\ 0 & 0 & \frac{3\sqrt{15}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{5}i}{35} & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{14} & 0 & 0 & 0 \end{bmatrix}$
764	symmetry	$\frac{\sqrt{70}xz\left(x^2-3y^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_4^{(a)}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{7}}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & -\frac{3}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{70} & 0 \\ \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{70} & 0 & 0 & 0 & 0 & 0 & \frac{3}{20} \\ 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{7}}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & \frac{3\sqrt{6}}{40} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{280} & 0 \\ \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{280} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{6}}{40} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 \end{bmatrix}$
765	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$
	$\mathbb{M}_4^{(a)}(A_2, 1)$	$\begin{bmatrix} 0 & -\frac{1}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{10}}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{1}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{10}}{140} & 0 & 0 \\ \frac{1}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{10}}{35} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{1}{7} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{7} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{10}}{35} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{14} & 0 \end{bmatrix}$
766	symmetry	$\frac{\sqrt{70}yz\left(3x^2-y^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_4^{(a)}(A_2,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{7}i}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & -\frac{3i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{70} & 0 \\ \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{70} & 0 & 0 & 0 & 0 & 0 & -\frac{3i}{20} \\ 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{7}i}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & \frac{3\sqrt{6}i}{40} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{280} & 0 \\ \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{280} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{6}i}{40} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 \end{bmatrix}$
767	symmetry	$-\frac{\sqrt{10}yz\left(3x^2+3y^2-4z^2\right)}{4}$
	$\mathbb{M}_{4,1}^{(a)}(E,1)$	$\begin{bmatrix} \frac{\sqrt{2}i}{56} & 0 & \frac{\sqrt{5}i}{28} & 0 & 0 & 0 & 0 & \frac{9\sqrt{3}i}{140} & 0 & \frac{3\sqrt{15}i}{70} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{56} & 0 & -\frac{\sqrt{15}i}{28} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{3}i}{35} & 0 & -\frac{3\sqrt{5}i}{140} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}i}{28} & 0 & \frac{\sqrt{30}i}{56} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}i}{140} & 0 & -\frac{3\sqrt{3}i}{35} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{28} & 0 & -\frac{\sqrt{2}i}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{15}i}{70} & 0 & \frac{9\sqrt{3}i}{140} & 0 \\ 0 & -\frac{\sqrt{2}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{140} & 0 & \frac{\sqrt{5}i}{14} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{14} & 0 & \frac{\sqrt{5}i}{14} & 0 & 0 & 0 & 0 & -\frac{13\sqrt{3}i}{140} & 0 & -\frac{\sqrt{15}i}{70} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{280} & 0 & -\frac{\sqrt{30}i}{40} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{40} & 0 & -\frac{\sqrt{2}i}{280} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{14} & 0 & \frac{\sqrt{2}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{70} & 0 & \frac{13\sqrt{3}i}{140} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{14} & 0 & -\frac{\sqrt{105}i}{140} \end{bmatrix}$
768	symmetry	$\frac{\sqrt{10}xz\left(3x^2+3y^2-4z^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_{4,2}^{(a)}(E,1)$	$\begin{bmatrix} -\frac{\sqrt{2}}{56} & 0 & \frac{\sqrt{5}}{28} & 0 & 0 & 0 & 0 & -\frac{9\sqrt{3}}{140} & 0 & \frac{3\sqrt{15}}{70} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{56} & 0 & -\frac{\sqrt{15}}{28} & 0 & 0 & 0 & 0 & \frac{3\sqrt{3}}{35} & 0 & -\frac{3\sqrt{5}}{140} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}}{28} & 0 & \frac{\sqrt{30}}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}}{140} & 0 & -\frac{3\sqrt{3}}{35} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{28} & 0 & -\frac{\sqrt{2}}{56} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{15}}{70} & 0 & \frac{9\sqrt{3}}{140} & 0 \\ 0 & -\frac{\sqrt{2}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 & \frac{\sqrt{5}}{14} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{14} & 0 & \frac{\sqrt{5}}{14} & 0 & 0 & 0 & 0 & \frac{13\sqrt{3}}{140} & 0 & -\frac{\sqrt{15}}{70} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{280} & 0 & -\frac{\sqrt{30}}{40} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{40} & 0 & -\frac{\sqrt{2}}{280} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{14} & 0 & \frac{\sqrt{2}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{70} & 0 & \frac{13\sqrt{3}}{140} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{14} & 0 & -\frac{\sqrt{105}}{140} \end{bmatrix}$
769	symmetry	$\frac{\sqrt{35}\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$
	$\mathbb{M}_{4,1}^{(a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{42}}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{42}}{140} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{35} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{35} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
770	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_{4,2}^{(a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{42}i}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{42}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{35} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{70} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
771	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$
	$\mathbb{M}_{4,1}^{(a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{10}}{28} & 0 & 0 & -\frac{3\sqrt{42}}{280} & 0 & 0 & 0 & -\frac{9\sqrt{30}}{280} & 0 & 0 & 0 \\ \frac{\sqrt{3}}{28} & 0 & 0 & 0 & \frac{\sqrt{15}}{28} & 0 & 0 & \frac{33\sqrt{2}}{280} & 0 & 0 & 0 & -\frac{3\sqrt{6}}{280} & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{28} & 0 & 0 & 0 & -\frac{\sqrt{3}}{28} & 0 & 0 & -\frac{3\sqrt{6}}{280} & 0 & 0 & 0 & \frac{33\sqrt{2}}{280} & 0 \\ 0 & 0 & \frac{\sqrt{10}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{30}}{280} & 0 & 0 & 0 & -\frac{3\sqrt{42}}{280} \\ 0 & 0 & \frac{3\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}}{28} & 0 & 0 & \frac{3\sqrt{42}}{140} & 0 & 0 & 0 & -\frac{\sqrt{30}}{140} & 0 & 0 & 0 \\ \frac{3\sqrt{2}}{28} & 0 & 0 & 0 & -\frac{\sqrt{10}}{28} & 0 & 0 & -\frac{9\sqrt{3}}{140} & 0 & 0 & 0 & \frac{17}{140} & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{28} & 0 & 0 & 0 & \frac{3\sqrt{2}}{28} & 0 & 0 & -\frac{17}{140} & 0 & 0 & 0 & \frac{9\sqrt{3}}{140} & 0 \\ 0 & 0 & -\frac{\sqrt{10}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{140} & 0 & 0 & 0 & -\frac{3\sqrt{42}}{140} \\ 0 & 0 & 0 & \frac{3\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{14} & 0 & 0 & 0 \end{bmatrix}$
772	symmetry	$\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_{4,2}^{(a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{10}i}{28} & 0 & 0 & \frac{3\sqrt{42}i}{280} & 0 & 0 & 0 & -\frac{9\sqrt{30}i}{280} & 0 & 0 & 0 \\ -\frac{\sqrt{3}i}{28} & 0 & 0 & 0 & \frac{\sqrt{15}i}{28} & 0 & 0 & -\frac{33\sqrt{2}i}{280} & 0 & 0 & 0 & -\frac{3\sqrt{6}i}{280} & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{28} & 0 & 0 & \frac{3\sqrt{6}i}{280} & 0 & 0 & 0 & \frac{33\sqrt{2}i}{280} & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{30}i}{280} & 0 & 0 & 0 & -\frac{3\sqrt{42}i}{280} \\ 0 & 0 & \frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}i}{28} & 0 & 0 & -\frac{3\sqrt{42}i}{140} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{140} & 0 & 0 & 0 \\ -\frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{10}i}{28} & 0 & 0 & \frac{9\sqrt{3}i}{140} & 0 & 0 & 0 & \frac{17i}{140} & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{28} & 0 & 0 & 0 & \frac{3\sqrt{2}i}{28} & 0 & 0 & \frac{17i}{140} & 0 & 0 & 0 & \frac{9\sqrt{3}i}{140} & 0 \\ 0 & 0 & \frac{\sqrt{10}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{140} & 0 & 0 & 0 & -\frac{3\sqrt{42}i}{140} \\ 0 & 0 & 0 & -\frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{14} & 0 & 0 & 0 \end{bmatrix}$
773	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{M}_{2}^{(1,-1;a)}(A_2)$	$\begin{bmatrix} 0 & -\frac{3\sqrt{6}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}}{35} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{6\sqrt{3}}{35} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{6\sqrt{3}}{35} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{6}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}}{35} & 0 & 0 \\ \frac{\sqrt{6}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{15}}{70} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{4\sqrt{6}}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{70} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{4\sqrt{6}}{105} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{70} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{105} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{15}}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3}{14} & 0 \end{bmatrix}$
774	symmetry	$\sqrt{3}yz$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_{2,1}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} \frac{3\sqrt{10}i}{140} & 0 & \frac{9i}{140} & 0 & 0 & 0 & 0 & \frac{2\sqrt{15}i}{35} & 0 & \frac{2\sqrt{3}i}{35} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{140} & 0 & \frac{\sqrt{3}i}{28} & 0 & 0 & 0 & 0 & \frac{2\sqrt{15}i}{35} & 0 & \frac{6i}{35} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{28} & 0 & \frac{\sqrt{6}i}{140} & 0 & 0 & 0 & 0 & \frac{6i}{35} & 0 & \frac{2\sqrt{15}i}{35} & 0 & 0 \\ 0 & 0 & 0 & -\frac{9i}{140} & 0 & -\frac{3\sqrt{10}i}{140} & 0 & 0 & 0 & 0 & \frac{2\sqrt{3}i}{35} & 0 & \frac{2\sqrt{15}i}{35} & 0 \\ 0 & -\frac{\sqrt{10}i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & -\frac{3i}{28} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{10}i}{35} & 0 & -\frac{2i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{140} & 0 & -\frac{11\sqrt{3}i}{140} & 0 & 0 & 0 & 0 \\ 0 & \frac{2i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}i}{140} & 0 & -\frac{\sqrt{6}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{2i}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{20} & 0 & -\frac{3\sqrt{10}i}{140} & 0 & 0 \\ 0 & 0 & 0 & -\frac{2i}{35} & 0 & \frac{\sqrt{10}i}{35} & 0 & 0 & 0 & 0 & \frac{11\sqrt{3}i}{140} & 0 & \frac{\sqrt{15}i}{140} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3i}{28} & 0 & \frac{\sqrt{21}i}{28} \end{bmatrix}$
775	symmetry	$-\sqrt{3}xz$
	$\mathbb{M}_{2,2}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} -\frac{3\sqrt{10}}{140} & 0 & \frac{9}{140} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}}{35} & 0 & \frac{2\sqrt{3}}{35} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{140} & 0 & \frac{\sqrt{3}}{28} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}}{35} & 0 & \frac{6}{35} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{28} & 0 & \frac{\sqrt{6}}{140} & 0 & 0 & 0 & 0 & -\frac{6}{35} & 0 & \frac{2\sqrt{15}}{35} & 0 & 0 \\ 0 & 0 & 0 & \frac{9}{140} & 0 & -\frac{3\sqrt{10}}{140} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{3}}{35} & 0 & \frac{2\sqrt{15}}{35} & 0 \\ 0 & -\frac{\sqrt{10}}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & -\frac{3}{28} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{10}}{35} & 0 & -\frac{2}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{140} & 0 & -\frac{11\sqrt{3}}{140} & 0 & 0 & 0 & 0 \\ 0 & -\frac{2}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{140} & 0 & -\frac{\sqrt{6}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{2}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{20} & 0 & -\frac{3\sqrt{10}}{140} & 0 & 0 \\ 0 & 0 & 0 & \frac{2}{35} & 0 & \frac{\sqrt{10}}{35} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{3}}{140} & 0 & \frac{\sqrt{15}}{140} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3}{28} & 0 & \frac{\sqrt{21}}{28} \end{bmatrix}$
776	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_{2,1}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{3}{70} & 0 & 0 & -\frac{\sqrt{105}}{35} & 0 & 0 & 0 & -\frac{\sqrt{3}}{35} & 0 & 0 & 0 \\ \frac{\sqrt{30}}{70} & 0 & 0 & 0 & -\frac{\sqrt{6}}{35} & 0 & 0 & -\frac{3\sqrt{5}}{35} & 0 & 0 & 0 & -\frac{\sqrt{15}}{35} & 0 & 0 \\ 0 & \frac{\sqrt{6}}{35} & 0 & 0 & 0 & -\frac{\sqrt{30}}{70} & 0 & 0 & -\frac{\sqrt{15}}{35} & 0 & 0 & 0 & -\frac{3\sqrt{5}}{35} & 0 \\ 0 & 0 & \frac{3}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{35} & 0 & 0 & 0 & -\frac{\sqrt{105}}{35} \\ 0 & 0 & \frac{\sqrt{5}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{70} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3}{35} & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & \frac{2\sqrt{3}}{35} & 0 & 0 & 0 \\ \frac{\sqrt{5}}{35} & 0 & 0 & 0 & \frac{3}{35} & 0 & 0 & -\frac{\sqrt{30}}{35} & 0 & 0 & 0 & \frac{3\sqrt{10}}{70} & 0 & 0 \\ 0 & \frac{3}{35} & 0 & 0 & 0 & \frac{\sqrt{5}}{35} & 0 & 0 & -\frac{3\sqrt{10}}{70} & 0 & 0 & 0 & \frac{\sqrt{30}}{35} & 0 \\ 0 & 0 & \frac{3}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{3}}{35} & 0 & 0 & 0 & \frac{\sqrt{105}}{70} \\ 0 & 0 & 0 & \frac{\sqrt{5}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{70} & 0 & 0 & 0 \end{bmatrix}$
777	symmetry	$-\sqrt{3}xy$
	$\mathbb{M}_{2,2}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{3i}{70} & 0 & 0 & \frac{\sqrt{105}i}{35} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{35} & 0 & 0 & 0 \\ -\frac{\sqrt{30}i}{70} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{35} & 0 & 0 & \frac{3\sqrt{5}i}{35} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{35} & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{35} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{70} & 0 & 0 & \frac{\sqrt{15}i}{35} & 0 & 0 & 0 & -\frac{3\sqrt{5}i}{35} & 0 \\ 0 & 0 & -\frac{3i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{35} & 0 & 0 & 0 & -\frac{\sqrt{105}i}{35} \\ 0 & 0 & \frac{\sqrt{5}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{70} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3i}{35} & 0 & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 & 0 & \frac{2\sqrt{3}i}{35} & 0 & 0 & 0 \\ -\frac{\sqrt{5}i}{35} & 0 & 0 & 0 & \frac{3i}{35} & 0 & 0 & \frac{\sqrt{30}i}{35} & 0 & 0 & 0 & \frac{3\sqrt{10}i}{70} & 0 & 0 \\ 0 & -\frac{3i}{35} & 0 & 0 & 0 & \frac{\sqrt{5}i}{35} & 0 & 0 & \frac{3\sqrt{10}i}{70} & 0 & 0 & 0 & \frac{\sqrt{30}i}{35} & 0 \\ 0 & 0 & -\frac{3i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{3}i}{35} & 0 & 0 & 0 & \frac{\sqrt{105}i}{70} \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{70} & 0 & 0 & 0 \end{bmatrix}$
778	symmetry	$\frac{\sqrt{70}xz\left(x^2-3y^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_4^{(1,-1;a)}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{336} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{112} & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 \\ -\frac{\sqrt{14}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} \\ 0 & \frac{\sqrt{210}}{336} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{24} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & \frac{3\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{112} & 0 \\ -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{112} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{16} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}}{56} & 0 & 0 & 0 & 0 \end{bmatrix}$
779	symmetry	$\frac{3x^4}{8}+\frac{3x^2y^2}{4}-3x^2z^2+\frac{3y^4}{8}-3y^2z^2+z^4$
	$\mathbb{M}_4^{(1,-1;a)}(A_2,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{3}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{28} & 0 & 0 \\ -\frac{\sqrt{3}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{21} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{2}}{28} & 0 \end{bmatrix}$
780	symmetry	$\frac{\sqrt{70}yz\left(3x^2-y^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_4^{(1,-1;a)}(A_2,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{336} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{112} & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 \\ -\frac{\sqrt{14}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} \\ 0 & \frac{\sqrt{210}i}{336} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{24} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & \frac{3\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{112} & 0 \\ -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{16} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}i}{56} & 0 & 0 & 0 & 0 \end{bmatrix}$
781	symmetry	$-\frac{\sqrt{10}yz\left(3x^2+3y^2-4z^2\right)}{4}$
	$\mathbb{M}_{4,1}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} -\frac{\sqrt{6}i}{336} & 0 & -\frac{\sqrt{15}i}{168} & 0 & 0 & 0 & 0 & -\frac{3i}{28} & 0 & -\frac{\sqrt{5}i}{14} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{112} & 0 & \frac{\sqrt{5}i}{56} & 0 & 0 & 0 & 0 & \frac{i}{7} & 0 & \frac{\sqrt{15}i}{84} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}i}{56} & 0 & -\frac{\sqrt{10}i}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{84} & 0 & \frac{i}{7} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}i}{168} & 0 & \frac{\sqrt{6}i}{336} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{14} & 0 & -\frac{3i}{28} & 0 \\ 0 & \frac{\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{56} & 0 & \frac{5\sqrt{15}i}{84} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}i}{42} & 0 & -\frac{\sqrt{15}i}{42} & 0 & 0 & 0 & 0 & -\frac{13i}{56} & 0 & -\frac{\sqrt{5}i}{28} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{336} & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & -\frac{\sqrt{6}i}{336} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{42} & 0 & -\frac{\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{28} & 0 & \frac{13i}{56} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{15}i}{84} & 0 & -\frac{\sqrt{35}i}{56} \end{bmatrix}$
782	symmetry	$\frac{\sqrt{10}xz\left(3x^2+3y^2-4z^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_{4,2}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} \frac{\sqrt{6}}{336} & 0 & -\frac{\sqrt{15}}{168} & 0 & 0 & 0 & 0 & \frac{3}{28} & 0 & -\frac{\sqrt{5}}{14} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{112} & 0 & \frac{\sqrt{5}}{56} & 0 & 0 & 0 & 0 & -\frac{1}{7} & 0 & \frac{\sqrt{15}}{84} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}}{56} & 0 & -\frac{\sqrt{10}}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{84} & 0 & \frac{1}{7} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{168} & 0 & \frac{\sqrt{6}}{336} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{14} & 0 & -\frac{3}{28} & 0 \\ 0 & \frac{\sqrt{6}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{56} & 0 & \frac{5\sqrt{15}}{84} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}}{42} & 0 & -\frac{\sqrt{15}}{42} & 0 & 0 & 0 & 0 & \frac{13}{56} & 0 & -\frac{\sqrt{5}}{28} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{336} & 0 & -\frac{\sqrt{10}}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{16} & 0 & -\frac{\sqrt{6}}{336} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}}{42} & 0 & -\frac{\sqrt{6}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{28} & 0 & \frac{13}{56} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{15}}{84} & 0 & -\frac{\sqrt{35}}{56} \end{bmatrix}$
783	symmetry	$\frac{\sqrt{35}\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$
	$\mathbb{M}_{4,1}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
784	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_{4,2}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
785	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$
	$\mathbb{M}_{4,1}^{(1,-1;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{30}}{168} & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & \frac{3\sqrt{10}}{56} & 0 & 0 & 0 \\ -\frac{1}{56} & 0 & 0 & 0 & -\frac{\sqrt{5}}{56} & 0 & 0 & -\frac{11\sqrt{6}}{168} & 0 & 0 & 0 & \frac{\sqrt{2}}{56} & 0 & 0 \\ 0 & \frac{\sqrt{5}}{56} & 0 & 0 & 0 & \frac{1}{56} & 0 & 0 & \frac{\sqrt{2}}{56} & 0 & 0 & 0 & -\frac{11\sqrt{6}}{168} & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{56} & 0 & 0 & 0 & \frac{\sqrt{14}}{56} \\ 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{2}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}}{84} & 0 & 0 & \frac{3\sqrt{14}}{56} & 0 & 0 & 0 & -\frac{\sqrt{10}}{56} & 0 & 0 & 0 \\ -\frac{\sqrt{6}}{28} & 0 & 0 & 0 & \frac{\sqrt{30}}{84} & 0 & 0 & -\frac{9}{56} & 0 & 0 & 0 & \frac{17\sqrt{3}}{168} & 0 & 0 \\ 0 & \frac{\sqrt{30}}{84} & 0 & 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & 0 & -\frac{17\sqrt{3}}{168} & 0 & 0 & 0 & \frac{9}{56} & 0 \\ 0 & 0 & \frac{\sqrt{30}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{56} & 0 & 0 & 0 & -\frac{3\sqrt{14}}{56} \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{2}}{28} & 0 & 0 & 0 \end{bmatrix}$
786	symmetry	$\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_{4,2}^{(1,-1;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{30}i}{168} & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & \frac{3\sqrt{10}i}{56} & 0 & 0 & 0 \\ \frac{i}{56} & 0 & 0 & 0 & -\frac{\sqrt{5}i}{56} & 0 & 0 & \frac{11\sqrt{6}i}{168} & 0 & 0 & 0 & \frac{\sqrt{2}i}{56} & 0 & 0 \\ 0 & -\frac{\sqrt{5}i}{56} & 0 & 0 & 0 & \frac{i}{56} & 0 & 0 & -\frac{\sqrt{2}i}{56} & 0 & 0 & 0 & -\frac{11\sqrt{6}i}{168} & 0 \\ 0 & 0 & \frac{\sqrt{30}i}{168} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{56} & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} \\ 0 & 0 & -\frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{2}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{84} & 0 & 0 & -\frac{3\sqrt{14}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{10}i}{56} & 0 & 0 & 0 \\ \frac{\sqrt{6}i}{28} & 0 & 0 & 0 & \frac{\sqrt{30}i}{84} & 0 & 0 & \frac{9i}{56} & 0 & 0 & 0 & \frac{17\sqrt{3}i}{168} & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{84} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{28} & 0 & 0 & \frac{17\sqrt{3}i}{168} & 0 & 0 & 0 & \frac{9i}{56} & 0 \\ 0 & 0 & -\frac{\sqrt{30}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{56} & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{56} \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{2}i}{28} & 0 & 0 & 0 \end{bmatrix}$
787	symmetry	$\frac{\sqrt{462}xy\left(x^2-3y^2\right)\left(3x^2-y^2\right)}{16}$
	$\mathbb{M}_{6}^{(1,-1;a)}(A_1,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
788	symmetry	$-\frac{\sqrt{210}xz\left(x^2-3y^2\right)\left(3x^2+3y^2-8z^2\right)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_6^{(1,-1;a)}(A_1,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}}{44} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}}{44} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}}{44} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}}{44} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}}{44} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}}{44} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}}{44} & 0 & 0 & 0 & 0 \end{bmatrix}$
789	symmetry	$-\frac{5x^6}{16}-\frac{15x^4y^2}{16}+\frac{45x^4z^2}{8}-\frac{15x^2y^4}{16}+\frac{45x^2y^2z^2}{4}-\frac{15x^2z^4}{2}-\frac{5y^6}{16}+\frac{45y^4z^2}{8}-\frac{15y^2z^4}{2}+z^6$
	$\mathbb{M}_6^{(1,-1;a)}(A_2,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{66}}{132} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}}{44} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{33}}{66} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{33}}{66} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}}{132} & 0 \end{bmatrix}$
790	symmetry	$\frac{\sqrt{462}(x-y)(x+y)\left(x^2-4xy+y^2\right)\left(x^2+4xy+y^2\right)}{32}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_6^{(1,-1;a)}(A_2,2)$	$\begin{bmatrix} 0&0&0&0&0&0&0&0&0&0&0&0&0&0 \\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0 \\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0 \\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0 \\ 0&0&0&0&0&0&0&0&0&0&0&0&0&\frac{1}{2} \\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0 \\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0 \\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0 \\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0 \\ 0&0&0&0&0&0&-\frac{1}{2}&0&0&0&0&0&0&0 \end{bmatrix}$
791	symmetry	$-\frac{\sqrt{210}yz\left(3x^2-y^2\right)\left(3x^2+3y^2-8z^2\right)}{16}$
	$\mathbb{M}_6^{(1,-1;a)}(A_2,3)$	$\begin{bmatrix} 0&0&0&0&0&0&0&0&0&0&0&0&0&0 \\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0 \\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0 \\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0 \\ 0&0&0&0&0&0&0&0&0&0&-\frac{\sqrt{77}i}{44}&0&0&0 \\ 0&0&0&0&0&0&0&0&0&0&0&\frac{\sqrt{231}i}{44}&0&0 \\ 0&0&0&0&0&0&-\frac{\sqrt{22}i}{44}&0&0&0&0&0&-\frac{\sqrt{154}i}{44}&0 \\ 0&0&0&0&0&0&0&\frac{\sqrt{154}i}{44}&0&0&0&0&0&\frac{\sqrt{22}i}{44} \\ 0&0&0&0&0&0&0&0&-\frac{\sqrt{231}i}{44}&0&0&0&0&0 \\ 0&0&0&0&0&0&0&0&0&\frac{\sqrt{77}i}{44}&0&0&0&0 \end{bmatrix}$
792	symmetry	$\frac{3\sqrt{154}yz\left(5x^4-10x^2y^2+y^4\right)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_{6,1}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
793	symmetry	$\frac{3\sqrt{154}xz\left(x^4-10x^2y^2+5y^4\right)}{16}$
	$\mathbb{M}_{6,2}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{12} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
794	symmetry	$\frac{\sqrt{21}yz\left(5x^4+10x^2y^2-20x^2z^2+5y^4-20y^2z^2+8z^4\right)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_{6,1}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}i}{264} & 0 & -\frac{\sqrt{462}i}{264} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{770}i}{264} & 0 & \frac{5\sqrt{154}i}{264} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}i}{132} & 0 & -\frac{5\sqrt{77}i}{132} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{77}i}{132} & 0 & \frac{\sqrt{1155}i}{132} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{154}i}{264} & 0 & -\frac{\sqrt{770}i}{264} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{462}i}{264} & 0 & \frac{\sqrt{22}i}{264} \end{bmatrix}$
795	symmetry	$-\frac{\sqrt{21}xz\left(5x^4+10x^2y^2-20x^2z^2+5y^4-20y^2z^2+8z^4\right)}{8}$
	$\mathbb{M}_{6,2}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{264} & 0 & -\frac{\sqrt{462}}{264} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}}{264} & 0 & \frac{5\sqrt{154}}{264} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{132} & 0 & -\frac{5\sqrt{77}}{132} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{77}}{132} & 0 & \frac{\sqrt{1155}}{132} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{154}}{264} & 0 & -\frac{\sqrt{770}}{264} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{462}}{264} & 0 & \frac{\sqrt{22}}{264} \end{bmatrix}$
796	symmetry	$-\frac{3\sqrt{7}\left(x^2+y^2-10z^2\right)\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_{6,1}^{(1,-1;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{132} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{66} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{132} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}}{44} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
797	symmetry	$-\frac{3\sqrt{7}xy(x-y)(x+y)\left(x^2+y^2-10z^2\right)}{4}$
	$\mathbb{M}_{6,2}^{(1,-1;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}i}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}i}{132} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{66} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}i}{132} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}i}{44} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
798	symmetry	$\frac{\sqrt{210}(x-y)(x+y)\left(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4\right)}{32}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_{6,1}^{(1,-1;a)}(E,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}}{66} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}}{66} & 0 & 0 & 0 & -\frac{\sqrt{385}}{66} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}}{66} & 0 & 0 & 0 & \frac{\sqrt{462}}{66} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{462}}{66} & 0 & 0 & 0 & -\frac{\sqrt{154}}{66} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{385}}{66} & 0 & 0 & 0 & \frac{\sqrt{11}}{66} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}}{66} & 0 & 0 & 0 \end{bmatrix}$
799	symmetry	$-\frac{\sqrt{210}xy\left(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4\right)}{16}$
	$\mathbb{M}_{6,2}^{(1,-1;a)}(E,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}i}{66} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{11}i}{66} & 0 & 0 & 0 & -\frac{\sqrt{385}i}{66} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}i}{66} & 0 & 0 & 0 & \frac{\sqrt{462}i}{66} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{462}i}{66} & 0 & 0 & 0 & -\frac{\sqrt{154}i}{66} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}i}{66} & 0 & 0 & 0 & \frac{\sqrt{11}i}{66} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}i}{66} & 0 & 0 & 0 \end{bmatrix}$
800	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_2^{(1,0;a)}(A_2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{15}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{30}}{70} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{30}}{70} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{14} & 0 & 0 \\ \frac{\sqrt{15}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{2\sqrt{15}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{70} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{15}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{70} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{28} & 0 \end{bmatrix}$
801	symmetry	$\sqrt{3}yz$
	$\mathbb{M}_{2,1}^{(1,0;a)}(E,1)$	$\begin{bmatrix} \frac{i}{14} & 0 & \frac{3\sqrt{10}i}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{14} & 0 & -\frac{\sqrt{30}i}{70} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{210} & 0 & \frac{\sqrt{30}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{14} & 0 & -\frac{3\sqrt{10}i}{70} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{30}i}{84} & 0 & \frac{\sqrt{15}i}{210} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{70} & 0 & -\frac{\sqrt{6}i}{14} & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{10}i}{140} & 0 & -\frac{i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{70} & 0 & -\frac{\sqrt{6}i}{14} & 0 \\ 0 & -\frac{3i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{10}i}{56} & 0 & 0 & 0 & 0 & 0 \\ \frac{3i}{14} & 0 & -\frac{3\sqrt{10}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{168} & 0 & -\frac{11\sqrt{30}i}{840} & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{10}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{28} & 0 & -\frac{\sqrt{15}i}{60} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{10}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{60} & 0 & -\frac{i}{28} & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{10}i}{70} & 0 & \frac{3i}{14} & 0 & 0 & 0 & 0 & \frac{11\sqrt{30}i}{840} & 0 & \frac{\sqrt{6}i}{168} & 0 \\ 0 & 0 & 0 & 0 & -\frac{3i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{56} & 0 & \frac{\sqrt{210}i}{168} \end{bmatrix}$
802	symmetry	$-\sqrt{3}xz$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_{2,2}^{(1,0;a)}(E,1)$	$\begin{bmatrix} -\frac{1}{14} & 0 & \frac{3\sqrt{10}}{140} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{14} & 0 & -\frac{\sqrt{30}}{70} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}}{210} & 0 & \frac{\sqrt{30}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{14} & 0 & -\frac{3\sqrt{10}}{70} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}}{84} & 0 & \frac{\sqrt{15}}{210} & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{70} & 0 & -\frac{\sqrt{6}}{14} & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{10}}{140} & 0 & -\frac{1}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{70} & 0 & -\frac{\sqrt{6}}{14} & 0 \\ 0 & -\frac{3}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{10}}{56} & 0 & 0 & 0 & 0 & 0 \\ -\frac{3}{14} & 0 & -\frac{3\sqrt{10}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{168} & 0 & -\frac{11\sqrt{30}}{840} & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{10}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{28} & 0 & -\frac{\sqrt{15}}{60} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{60} & 0 & -\frac{1}{28} & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{10}}{70} & 0 & \frac{3}{14} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{30}}{840} & 0 & \frac{\sqrt{6}}{168} & 0 \\ 0 & 0 & 0 & 0 & \frac{3}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{56} & 0 & \frac{\sqrt{210}}{168} \end{bmatrix}$
803	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{M}_{2,1}^{(1,0;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{10}}{70} & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & \frac{\sqrt{30}}{140} & 0 & 0 & 0 \\ \frac{\sqrt{3}}{21} & 0 & 0 & 0 & -\frac{2\sqrt{15}}{105} & 0 & 0 & \frac{3\sqrt{2}}{28} & 0 & 0 & 0 & \frac{\sqrt{6}}{28} & 0 & 0 \\ 0 & \frac{2\sqrt{15}}{105} & 0 & 0 & 0 & -\frac{\sqrt{3}}{21} & 0 & 0 & \frac{\sqrt{6}}{28} & 0 & 0 & 0 & \frac{3\sqrt{2}}{28} & 0 \\ 0 & 0 & \frac{\sqrt{10}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{140} & 0 & 0 & 0 & \frac{\sqrt{42}}{28} \\ 0 & 0 & \frac{3\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{9\sqrt{10}}{140} & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 & \frac{\sqrt{30}}{105} & 0 & 0 & 0 \\ \frac{3\sqrt{2}}{28} & 0 & 0 & 0 & \frac{9\sqrt{10}}{140} & 0 & 0 & -\frac{\sqrt{3}}{21} & 0 & 0 & 0 & \frac{1}{14} & 0 & 0 \\ 0 & \frac{9\sqrt{10}}{140} & 0 & 0 & 0 & \frac{3\sqrt{2}}{28} & 0 & 0 & -\frac{1}{14} & 0 & 0 & 0 & \frac{\sqrt{3}}{21} & 0 \\ 0 & 0 & \frac{9\sqrt{10}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{105} & 0 & 0 & 0 & \frac{\sqrt{42}}{84} \\ 0 & 0 & 0 & \frac{3\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{84} & 0 & 0 & 0 \end{bmatrix}$
804	symmetry	$-\sqrt{3}xy$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_{2,2}^{(1,0;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{10}i}{70} & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 & \frac{\sqrt{30}i}{140} & 0 & 0 & 0 \\ -\frac{\sqrt{3}i}{21} & 0 & 0 & 0 & -\frac{2\sqrt{15}i}{105} & 0 & 0 & -\frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & \frac{\sqrt{6}i}{28} & 0 & 0 \\ 0 & -\frac{2\sqrt{15}i}{105} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{21} & 0 & 0 & -\frac{\sqrt{6}i}{28} & 0 & 0 & 0 & \frac{3\sqrt{2}i}{28} & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{140} & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} \\ 0 & 0 & \frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{9\sqrt{10}i}{140} & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 & \frac{\sqrt{30}i}{105} & 0 & 0 & 0 \\ -\frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & \frac{9\sqrt{10}i}{140} & 0 & 0 & \frac{\sqrt{3}i}{21} & 0 & 0 & 0 & \frac{i}{14} & 0 & 0 \\ 0 & -\frac{9\sqrt{10}i}{140} & 0 & 0 & 0 & \frac{3\sqrt{2}i}{28} & 0 & 0 & \frac{i}{14} & 0 & 0 & 0 & \frac{\sqrt{3}i}{21} & 0 \\ 0 & 0 & -\frac{9\sqrt{10}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{105} & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} \\ 0 & 0 & 0 & -\frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{84} & 0 & 0 & 0 \end{bmatrix}$
805	symmetry	$\frac{\sqrt{70}xz\left(x^2-3y^2\right)}{4}$
	$\mathbb{M}_4^{(1,0;a)}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{27\sqrt{35}}{700} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{560} & -\frac{9\sqrt{5}}{100} & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{35}}{350} & 0 \\ -\frac{\sqrt{210}}{560} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{35}}{350} & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{5}}{100} \\ 0 & \frac{\sqrt{14}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{27\sqrt{35}}{700} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{280} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{200} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}}{70} & \frac{3\sqrt{30}}{400} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{2800} & 0 \\ -\frac{3\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{2800} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{30}}{400} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{200} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{280} & 0 & 0 & 0 & 0 \end{bmatrix}$
806	symmetry	$\frac{3x^4}{8}+\frac{3x^2y^2}{4}-3x^2z^2+\frac{3y^4}{8}-3y^2z^2+z^4$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_4^{(1,0;a)}(A_2,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{5}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{27\sqrt{2}}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{10}}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{10}}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{27\sqrt{2}}{140} & 0 & 0 \\ -\frac{3\sqrt{5}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{140} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{9\sqrt{5}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{35} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{5}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{5}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{9\sqrt{5}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{35} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{140} & 0 \end{bmatrix}$
807	symmetry	$\frac{\sqrt{70}yz\left(3x^2-y^2\right)}{4}$
	$\mathbb{M}_4^{(1,0;a)}(A_2,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{27\sqrt{35}i}{700} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{560} & -\frac{9\sqrt{5}i}{100} & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{35}i}{350} & 0 \\ -\frac{\sqrt{210}i}{560} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{35}i}{350} & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{5}i}{100} \\ 0 & \frac{\sqrt{14}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{27\sqrt{35}i}{700} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{280} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{200} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}i}{70} & \frac{3\sqrt{30}i}{400} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{2800} & 0 \\ -\frac{3\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{2800} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{30}i}{400} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{200} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{280} & 0 & 0 & 0 & 0 \end{bmatrix}$
808	symmetry	$-\frac{\sqrt{10}yz\left(3x^2+3y^2-4z^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_{4,1}^{(1,0;a)}(E,1)$	$\begin{bmatrix} -\frac{\sqrt{10}i}{560} & 0 & -\frac{i}{56} & 0 & 0 & 0 & 0 & \frac{27\sqrt{15}i}{700} & 0 & \frac{9\sqrt{3}i}{70} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{112} & 0 & \frac{\sqrt{3}i}{56} & 0 & 0 & 0 & 0 & -\frac{9\sqrt{15}i}{175} & 0 & -\frac{9i}{140} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{56} & 0 & -\frac{\sqrt{6}i}{112} & 0 & 0 & 0 & 0 & -\frac{9i}{140} & 0 & -\frac{9\sqrt{15}i}{175} & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{56} & 0 & \frac{\sqrt{10}i}{560} & 0 & 0 & 0 & 0 & \frac{9\sqrt{3}i}{70} & 0 & \frac{27\sqrt{15}i}{700} & 0 \\ 0 & \frac{3\sqrt{10}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{280} & 0 & \frac{i}{28} & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{10}i}{70} & 0 & -\frac{3i}{14} & 0 & 0 & 0 & 0 & -\frac{13\sqrt{15}i}{1400} & 0 & -\frac{\sqrt{3}i}{140} & 0 & 0 & 0 & 0 \\ 0 & \frac{3i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{2800} & 0 & -\frac{\sqrt{6}i}{80} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{80} & 0 & -\frac{\sqrt{10}i}{2800} & 0 & 0 \\ 0 & 0 & 0 & -\frac{3i}{14} & 0 & -\frac{3\sqrt{10}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{140} & 0 & \frac{13\sqrt{15}i}{1400} & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{10}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{28} & 0 & -\frac{\sqrt{21}i}{280} \end{bmatrix}$
809	symmetry	$\frac{\sqrt{10}xz\left(3x^2+3y^2-4z^2\right)}{4}$
	$\mathbb{M}_{4,2}^{(1,0;a)}(E,1)$	$\begin{bmatrix} \frac{\sqrt{10}}{560} & 0 & -\frac{1}{56} & 0 & 0 & 0 & 0 & -\frac{27\sqrt{15}}{700} & 0 & \frac{9\sqrt{3}}{70} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{112} & 0 & \frac{\sqrt{3}}{56} & 0 & 0 & 0 & 0 & \frac{9\sqrt{15}}{175} & 0 & -\frac{9}{140} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{56} & 0 & -\frac{\sqrt{6}}{112} & 0 & 0 & 0 & 0 & \frac{9}{140} & 0 & -\frac{9\sqrt{15}}{175} & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{56} & 0 & \frac{\sqrt{10}}{560} & 0 & 0 & 0 & 0 & -\frac{9\sqrt{3}}{70} & 0 & \frac{27\sqrt{15}}{700} & 0 \\ 0 & \frac{3\sqrt{10}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{280} & 0 & \frac{1}{28} & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{10}}{70} & 0 & -\frac{3}{14} & 0 & 0 & 0 & 0 & \frac{13\sqrt{15}}{1400} & 0 & -\frac{\sqrt{3}}{140} & 0 & 0 & 0 & 0 \\ 0 & -\frac{3}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{2800} & 0 & -\frac{\sqrt{6}}{80} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{80} & 0 & -\frac{\sqrt{10}}{2800} & 0 & 0 \\ 0 & 0 & 0 & \frac{3}{14} & 0 & -\frac{3\sqrt{10}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{140} & 0 & \frac{13\sqrt{15}}{1400} & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{28} & 0 & -\frac{\sqrt{21}}{280} \end{bmatrix}$
810	symmetry	$\frac{\sqrt{35}\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_{4,1}^{(1,0;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{210}}{700} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{10}}{100} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{10}}{100} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{35}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{210}}{700} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{350} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{100} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{100} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{350} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{140} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
811	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
	$\mathbb{M}_{4,2}^{(1,0;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{210}i}{700} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{10}i}{100} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{10}i}{100} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{35}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{210}i}{700} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{350} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{100} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{100} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{350} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{140} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
812	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_{4,1}^{(1,0;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{2}}{56} & 0 & 0 & -\frac{9\sqrt{210}}{1400} & 0 & 0 & 0 & -\frac{27\sqrt{6}}{280} & 0 & 0 & 0 \\ -\frac{\sqrt{15}}{280} & 0 & 0 & 0 & -\frac{\sqrt{3}}{56} & 0 & 0 & \frac{99\sqrt{10}}{1400} & 0 & 0 & 0 & -\frac{9\sqrt{30}}{1400} & 0 & 0 \\ 0 & \frac{\sqrt{3}}{56} & 0 & 0 & 0 & \frac{\sqrt{15}}{280} & 0 & 0 & -\frac{9\sqrt{30}}{1400} & 0 & 0 & 0 & \frac{99\sqrt{10}}{1400} & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{27\sqrt{6}}{280} & 0 & 0 & 0 & -\frac{9\sqrt{210}}{1400} \\ 0 & 0 & -\frac{9\sqrt{10}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{2}}{28} & 0 & 0 & \frac{3\sqrt{210}}{1400} & 0 & 0 & 0 & -\frac{\sqrt{6}}{280} & 0 & 0 & 0 \\ -\frac{9\sqrt{10}}{140} & 0 & 0 & 0 & \frac{3\sqrt{2}}{28} & 0 & 0 & -\frac{9\sqrt{15}}{1400} & 0 & 0 & 0 & \frac{17\sqrt{5}}{1400} & 0 & 0 \\ 0 & \frac{3\sqrt{2}}{28} & 0 & 0 & 0 & -\frac{9\sqrt{10}}{140} & 0 & 0 & -\frac{17\sqrt{5}}{1400} & 0 & 0 & 0 & \frac{9\sqrt{15}}{1400} & 0 \\ 0 & 0 & \frac{3\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{280} & 0 & 0 & 0 & -\frac{3\sqrt{210}}{1400} \\ 0 & 0 & 0 & -\frac{9\sqrt{10}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{140} & 0 & 0 & 0 \end{bmatrix}$
813	symmetry	$\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$
	$\mathbb{M}_{4,2}^{(1,0;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{2}i}{56} & 0 & 0 & \frac{9\sqrt{210}i}{1400} & 0 & 0 & 0 & -\frac{27\sqrt{6}i}{280} & 0 & 0 & 0 \\ \frac{\sqrt{15}i}{280} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{56} & 0 & 0 & -\frac{99\sqrt{10}i}{1400} & 0 & 0 & 0 & -\frac{9\sqrt{30}i}{1400} & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{56} & 0 & 0 & 0 & \frac{\sqrt{15}i}{280} & 0 & 0 & \frac{9\sqrt{30}i}{1400} & 0 & 0 & 0 & \frac{99\sqrt{10}i}{1400} & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{27\sqrt{6}i}{280} & 0 & 0 & 0 & -\frac{9\sqrt{210}i}{1400} \\ 0 & 0 & -\frac{9\sqrt{10}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{2}i}{28} & 0 & 0 & -\frac{3\sqrt{210}i}{1400} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{280} & 0 & 0 & 0 \\ \frac{9\sqrt{10}i}{140} & 0 & 0 & 0 & \frac{3\sqrt{2}i}{28} & 0 & 0 & \frac{9\sqrt{15}i}{1400} & 0 & 0 & 0 & \frac{17\sqrt{5}i}{1400} & 0 & 0 \\ 0 & -\frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & -\frac{9\sqrt{10}i}{140} & 0 & 0 & \frac{17\sqrt{5}i}{1400} & 0 & 0 & 0 & \frac{9\sqrt{15}i}{1400} & 0 \\ 0 & 0 & -\frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{280} & 0 & 0 & 0 & -\frac{3\sqrt{210}i}{1400} \\ 0 & 0 & 0 & \frac{9\sqrt{10}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{140} & 0 & 0 & 0 \end{bmatrix}$
814	symmetry	1

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_0^{(1,1;a)}(A_2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
815	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{M}_2^{(1,1;a)}(A_2)$	$\begin{bmatrix} 0 & \frac{12}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{2\sqrt{6}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{2}}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{6}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{2}}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{12}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{140} & 0 & 0 \\ \frac{3}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{21} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{35} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{6}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{3}}{105} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{6}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{3}}{105} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{35} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{21} & 0 \end{bmatrix}$
816	symmetry	$\sqrt{3}yz$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_{2,1}^{(1,1;a)}(E,1)$	$\begin{bmatrix} -\frac{2\sqrt{15}i}{35} & 0 & -\frac{3\sqrt{6}i}{35} & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}i}{140} & 0 & \frac{3\sqrt{2}i}{140} & 0 & 0 & 0 & 0 \\ 0 & \frac{2i}{35} & 0 & -\frac{\sqrt{2}i}{7} & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}i}{140} & 0 & \frac{3\sqrt{6}i}{140} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{7} & 0 & -\frac{2i}{35} & 0 & 0 & 0 & 0 & \frac{3\sqrt{6}i}{140} & 0 & \frac{3\sqrt{10}i}{140} & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{6}i}{35} & 0 & \frac{2\sqrt{15}i}{35} & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{140} & 0 & \frac{3\sqrt{10}i}{140} & 0 \\ 0 & -\frac{3\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{42} & 0 & \frac{\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{15}i}{70} & 0 & -\frac{3\sqrt{6}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{210} & 0 & \frac{11\sqrt{2}i}{210} & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{6}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{105} & 0 & \frac{i}{15} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{6}i}{70} & 0 & 0 & 0 & 0 & -\frac{i}{15} & 0 & \frac{\sqrt{15}i}{105} & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{6}i}{70} & 0 & \frac{3\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{2}i}{210} & 0 & -\frac{\sqrt{10}i}{210} & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{42} & 0 & -\frac{\sqrt{14}i}{42} \end{bmatrix}$
817	symmetry	$-\sqrt{3}xz$
	$\mathbb{M}_{2,2}^{(1,1;a)}(E,1)$	$\begin{bmatrix} \frac{2\sqrt{15}}{35} & 0 & -\frac{3\sqrt{6}}{35} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{140} & 0 & \frac{3\sqrt{2}}{140} & 0 & 0 & 0 & 0 \\ 0 & -\frac{2}{35} & 0 & -\frac{\sqrt{2}}{7} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{140} & 0 & \frac{3\sqrt{6}}{140} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{7} & 0 & -\frac{2}{35} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{6}}{140} & 0 & \frac{3\sqrt{10}}{140} & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{6}}{35} & 0 & \frac{2\sqrt{15}}{35} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{140} & 0 & \frac{3\sqrt{10}}{140} & 0 \\ 0 & -\frac{3\sqrt{15}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{42} & 0 & \frac{\sqrt{6}}{42} & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{15}}{70} & 0 & -\frac{3\sqrt{6}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{210} & 0 & \frac{11\sqrt{2}}{210} & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{6}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{105} & 0 & \frac{1}{15} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{6}}{70} & 0 & 0 & 0 & 0 & \frac{1}{15} & 0 & \frac{\sqrt{15}}{105} & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{6}}{70} & 0 & \frac{3\sqrt{15}}{70} & 0 & 0 & 0 & 0 & \frac{11\sqrt{2}}{210} & 0 & -\frac{\sqrt{10}}{210} & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{15}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{42} & 0 & -\frac{\sqrt{14}}{42} \end{bmatrix}$
818	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_{2,1}^{(1,1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{2\sqrt{6}}{35} & 0 & 0 & -\frac{3\sqrt{70}}{280} & 0 & 0 & 0 & -\frac{3\sqrt{2}}{280} & 0 & 0 & 0 \\ -\frac{4\sqrt{5}}{35} & 0 & 0 & 0 & \frac{8}{35} & 0 & 0 & -\frac{3\sqrt{30}}{280} & 0 & 0 & 0 & -\frac{3\sqrt{10}}{280} & 0 & 0 \\ 0 & -\frac{8}{35} & 0 & 0 & 0 & \frac{4\sqrt{5}}{35} & 0 & 0 & -\frac{3\sqrt{10}}{280} & 0 & 0 & 0 & -\frac{3\sqrt{30}}{280} & 0 \\ 0 & 0 & -\frac{2\sqrt{6}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{280} & 0 & 0 & 0 & -\frac{3\sqrt{70}}{280} \\ 0 & 0 & \frac{3\sqrt{30}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{105} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{9\sqrt{6}}{140} & 0 & 0 & \frac{\sqrt{70}}{105} & 0 & 0 & 0 & -\frac{4\sqrt{2}}{105} & 0 & 0 & 0 \\ \frac{3\sqrt{30}}{140} & 0 & 0 & 0 & \frac{9\sqrt{6}}{140} & 0 & 0 & \frac{4\sqrt{5}}{105} & 0 & 0 & 0 & -\frac{2\sqrt{15}}{105} & 0 & 0 \\ 0 & \frac{9\sqrt{6}}{140} & 0 & 0 & 0 & \frac{3\sqrt{30}}{140} & 0 & 0 & \frac{2\sqrt{15}}{105} & 0 & 0 & 0 & -\frac{4\sqrt{5}}{105} & 0 \\ 0 & 0 & \frac{9\sqrt{6}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{4\sqrt{2}}{105} & 0 & 0 & 0 & -\frac{\sqrt{70}}{105} \\ 0 & 0 & 0 & \frac{3\sqrt{30}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{105} & 0 & 0 & 0 \end{bmatrix}$
819	symmetry	$-\sqrt{3}xy$
	$\mathbb{M}_{2,2}^{(1,1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{2\sqrt{6}i}{35} & 0 & 0 & \frac{3\sqrt{70}i}{280} & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{280} & 0 & 0 & 0 \\ \frac{4\sqrt{5}i}{35} & 0 & 0 & 0 & \frac{8i}{35} & 0 & 0 & \frac{3\sqrt{30}i}{280} & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{280} & 0 & 0 \\ 0 & \frac{8i}{35} & 0 & 0 & 0 & \frac{4\sqrt{5}i}{35} & 0 & 0 & \frac{3\sqrt{10}i}{280} & 0 & 0 & 0 & -\frac{3\sqrt{30}i}{280} & 0 \\ 0 & 0 & \frac{2\sqrt{6}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{280} & 0 & 0 & 0 & -\frac{3\sqrt{70}i}{280} \\ 0 & 0 & \frac{3\sqrt{30}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{105} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{9\sqrt{6}i}{140} & 0 & 0 & -\frac{\sqrt{70}i}{105} & 0 & 0 & 0 & -\frac{4\sqrt{2}i}{105} & 0 & 0 & 0 \\ -\frac{3\sqrt{30}i}{140} & 0 & 0 & 0 & \frac{9\sqrt{6}i}{140} & 0 & 0 & -\frac{4\sqrt{5}i}{105} & 0 & 0 & 0 & -\frac{2\sqrt{15}i}{105} & 0 & 0 \\ 0 & -\frac{9\sqrt{6}i}{140} & 0 & 0 & 0 & \frac{3\sqrt{30}i}{140} & 0 & 0 & -\frac{2\sqrt{15}i}{105} & 0 & 0 & 0 & -\frac{4\sqrt{5}i}{105} & 0 \\ 0 & 0 & -\frac{9\sqrt{6}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{4\sqrt{2}i}{105} & 0 & 0 & 0 & -\frac{\sqrt{70}i}{105} \\ 0 & 0 & 0 & -\frac{3\sqrt{30}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{105} & 0 & 0 & 0 \end{bmatrix}$
820	symmetry	$\frac{\sqrt{70}xz\left(x^2-3y^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_4^{(1,1;a)}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{231}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{700} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{385}}{70} & \frac{\sqrt{330}}{300} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{1050} & 0 \\ \frac{\sqrt{385}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{1050} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{300} \\ 0 & -\frac{\sqrt{231}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{700} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2310}}{420} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{770}}{770} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{1650} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{420} & -\frac{3\sqrt{55}}{550} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}}{3850} & 0 \\ -\frac{\sqrt{2310}}{420} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}}{3850} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{55}}{550} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{1650} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2310}}{420} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{770}}{770} & 0 & 0 & 0 & 0 \end{bmatrix}$
821	symmetry	$\frac{3x^4}{8}+\frac{3x^2y^2}{4}-3x^2z^2+\frac{3y^4}{8}-3y^2z^2+z^4$
	$\mathbb{M}_4^{(1,1;a)}(A_2,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{330}}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{33}}{70} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{2\sqrt{55}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{210} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{55}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{210} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{33}}{70} & 0 & 0 \\ -\frac{\sqrt{330}}{420} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{55}}{385} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{330}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{8\sqrt{33}}{1155} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{330}}{210} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}}{385} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{330}}{210} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}}{385} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{8\sqrt{33}}{1155} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{420} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{55}}{385} & 0 \end{bmatrix}$
822	symmetry	$\frac{\sqrt{70}yz\left(3x^2-y^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_4^{(1,1;a)}(A_2,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{231}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{700} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}i}{70} & \frac{\sqrt{330}i}{300} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{1050} & 0 \\ \frac{\sqrt{385}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{1050} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}i}{300} \\ 0 & -\frac{\sqrt{231}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{700} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2310}i}{420} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}i}{770} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{1650} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{420} & -\frac{3\sqrt{55}i}{550} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{385}i}{3850} & 0 \\ -\frac{\sqrt{2310}i}{420} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}i}{3850} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{55}i}{550} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}i}{1650} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2310}i}{420} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{770}i}{770} & 0 & 0 & 0 & 0 \end{bmatrix}$
823	symmetry	$-\frac{\sqrt{10}yz\left(3x^2+3y^2-4z^2\right)}{4}$
	$\mathbb{M}_{4,1}^{(1,1;a)}(E,1)$	$\begin{bmatrix} \frac{\sqrt{165}i}{210} & 0 & \frac{\sqrt{66}i}{42} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{110}i}{700} & 0 & -\frac{\sqrt{22}i}{70} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{11}i}{14} & 0 & -\frac{\sqrt{22}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{110}i}{175} & 0 & \frac{\sqrt{66}i}{420} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{22}i}{14} & 0 & \frac{\sqrt{11}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{66}i}{420} & 0 & \frac{\sqrt{110}i}{175} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{66}i}{42} & 0 & -\frac{\sqrt{165}i}{210} & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}i}{70} & 0 & -\frac{3\sqrt{110}i}{700} & 0 \\ 0 & \frac{\sqrt{165}i}{210} & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}i}{770} & 0 & -\frac{\sqrt{66}i}{231} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{165}i}{210} & 0 & -\frac{\sqrt{66}i}{84} & 0 & 0 & 0 & 0 & \frac{13\sqrt{110}i}{3850} & 0 & \frac{\sqrt{22}i}{385} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{66}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{11550} & 0 & \frac{\sqrt{11}i}{110} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{66}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}i}{110} & 0 & \frac{\sqrt{165}i}{11550} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{66}i}{84} & 0 & -\frac{\sqrt{165}i}{210} & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}i}{385} & 0 & -\frac{13\sqrt{110}i}{3850} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{165}i}{210} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{66}i}{231} & 0 & \frac{\sqrt{154}i}{770} \end{bmatrix}$
824	symmetry	$\frac{\sqrt{10}xz\left(3x^2+3y^2-4z^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_{4,2}^{(1,1;a)}(E,1)$	$\begin{bmatrix} -\frac{\sqrt{165}}{210} & 0 & \frac{\sqrt{66}}{42} & 0 & 0 & 0 & 0 & \frac{3\sqrt{110}}{700} & 0 & -\frac{\sqrt{22}}{70} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{11}}{14} & 0 & -\frac{\sqrt{22}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}}{175} & 0 & \frac{\sqrt{66}}{420} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{22}}{14} & 0 & \frac{\sqrt{11}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}}{420} & 0 & \frac{\sqrt{110}}{175} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{66}}{42} & 0 & -\frac{\sqrt{165}}{210} & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{70} & 0 & -\frac{3\sqrt{110}}{700} & 0 \\ 0 & \frac{\sqrt{165}}{210} & 0 & 0 & 0 & 0 & \frac{\sqrt{154}}{770} & 0 & -\frac{\sqrt{66}}{231} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{165}}{210} & 0 & -\frac{\sqrt{66}}{84} & 0 & 0 & 0 & 0 & -\frac{13\sqrt{110}}{3850} & 0 & \frac{\sqrt{22}}{385} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{66}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{11550} & 0 & \frac{\sqrt{11}}{110} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{66}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{11}}{110} & 0 & \frac{\sqrt{165}}{11550} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{66}}{84} & 0 & -\frac{\sqrt{165}}{210} & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{385} & 0 & -\frac{13\sqrt{110}}{3850} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{210} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}}{231} & 0 & \frac{\sqrt{154}}{770} \end{bmatrix}$
825	symmetry	$\frac{\sqrt{35}\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$
	$\mathbb{M}_{4,1}^{(1,1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{385}}{350} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{150} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{150} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2310}}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{385}}{350} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{420} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{231}}{1155} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{420} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{4\sqrt{385}}{1925} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}}{275} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}}{275} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2310}}{420} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{4\sqrt{385}}{1925} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2310}}{420} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{231}}{1155} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
826	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_{4,2}^{(1,1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}i}{105} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}i}{350} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{150} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}i}{150} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2310}i}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{385}i}{350} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2310}i}{420} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{231}i}{1155} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}i}{420} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{4\sqrt{385}i}{1925} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}i}{275} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}i}{275} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2310}i}{420} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{4\sqrt{385}i}{1925} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2310}i}{420} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{231}i}{1155} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
827	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$
	$\mathbb{M}_{4,1}^{(1,1;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{33}}{21} & 0 & 0 & \frac{\sqrt{385}}{700} & 0 & 0 & 0 & \frac{3\sqrt{11}}{140} & 0 & 0 & 0 \\ \frac{\sqrt{110}}{70} & 0 & 0 & 0 & \frac{\sqrt{22}}{14} & 0 & 0 & -\frac{11\sqrt{165}}{2100} & 0 & 0 & 0 & \frac{\sqrt{55}}{700} & 0 & 0 \\ 0 & -\frac{\sqrt{22}}{14} & 0 & 0 & 0 & -\frac{\sqrt{110}}{70} & 0 & 0 & \frac{\sqrt{55}}{700} & 0 & 0 & 0 & -\frac{11\sqrt{165}}{2100} & 0 \\ 0 & 0 & \frac{\sqrt{33}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{11}}{140} & 0 & 0 & 0 & \frac{\sqrt{385}}{700} \\ 0 & 0 & -\frac{\sqrt{165}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{55}}{385} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{33}}{84} & 0 & 0 & -\frac{3\sqrt{385}}{1925} & 0 & 0 & 0 & \frac{\sqrt{11}}{385} & 0 & 0 & 0 \\ -\frac{\sqrt{165}}{140} & 0 & 0 & 0 & \frac{\sqrt{33}}{84} & 0 & 0 & \frac{9\sqrt{110}}{3850} & 0 & 0 & 0 & -\frac{17\sqrt{330}}{11550} & 0 & 0 \\ 0 & \frac{\sqrt{33}}{84} & 0 & 0 & 0 & -\frac{\sqrt{165}}{140} & 0 & 0 & \frac{17\sqrt{330}}{11550} & 0 & 0 & 0 & -\frac{9\sqrt{110}}{3850} & 0 \\ 0 & 0 & \frac{\sqrt{33}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}}{385} & 0 & 0 & 0 & \frac{3\sqrt{385}}{1925} \\ 0 & 0 & 0 & -\frac{\sqrt{165}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{55}}{385} & 0 & 0 & 0 \end{bmatrix}$
828	symmetry	$\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_{4,2}^{(1,1;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{33}i}{21} & 0 & 0 & -\frac{\sqrt{385}i}{700} & 0 & 0 & 0 & \frac{3\sqrt{11}i}{140} & 0 & 0 & 0 \\ -\frac{\sqrt{110}i}{70} & 0 & 0 & 0 & \frac{\sqrt{22}i}{14} & 0 & 0 & \frac{11\sqrt{165}i}{2100} & 0 & 0 & 0 & \frac{\sqrt{55}i}{700} & 0 & 0 \\ 0 & \frac{\sqrt{22}i}{14} & 0 & 0 & 0 & -\frac{\sqrt{110}i}{70} & 0 & 0 & -\frac{\sqrt{55}i}{700} & 0 & 0 & 0 & -\frac{11\sqrt{165}i}{2100} & 0 \\ 0 & 0 & -\frac{\sqrt{33}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{11}i}{140} & 0 & 0 & 0 & \frac{\sqrt{385}i}{700} \\ 0 & 0 & -\frac{\sqrt{165}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{55}i}{385} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{33}i}{84} & 0 & 0 & \frac{3\sqrt{385}i}{1925} & 0 & 0 & 0 & \frac{\sqrt{11}i}{385} & 0 & 0 & 0 \\ \frac{\sqrt{165}i}{140} & 0 & 0 & 0 & \frac{\sqrt{33}i}{84} & 0 & 0 & -\frac{9\sqrt{110}i}{3850} & 0 & 0 & 0 & -\frac{17\sqrt{330}i}{11550} & 0 & 0 \\ 0 & -\frac{\sqrt{33}i}{84} & 0 & 0 & 0 & -\frac{\sqrt{165}i}{140} & 0 & 0 & -\frac{17\sqrt{330}i}{11550} & 0 & 0 & 0 & -\frac{9\sqrt{110}i}{3850} & 0 \\ 0 & 0 & -\frac{\sqrt{33}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{11}i}{385} & 0 & 0 & 0 & \frac{3\sqrt{385}i}{1925} \\ 0 & 0 & 0 & \frac{\sqrt{165}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{55}i}{385} & 0 & 0 & 0 \end{bmatrix}$

bra: $= \langle \frac{5}{2}, \frac{5}{2}; f|\,, \langle \frac{5}{2}, \frac{3}{2}; f|\,, \langle \frac{5}{2}, \frac{1}{2}; f|\,, \langle \frac{5}{2}, -\frac{1}{2}; f|\,, \langle \frac{5}{2}, -\frac{3}{2}; f|\,, \langle \frac{5}{2}, -\frac{5}{2}; f|\,, \langle \frac{7}{2}, \frac{7}{2}; f|\,, \langle \frac{7}{2}, \frac{5}{2}; f|\,, \langle \frac{7}{2}, \frac{3}{2}; f|\,, \langle \frac{7}{2}, \frac{1}{2}; f|\,, \langle \frac{7}{2}, -\frac{1}{2}; f|\,, \langle \frac{7}{2}, -\frac{3}{2}; f|\,, \langle \frac{7}{2}, -\frac{5}{2}; f|\,, \langle \frac{7}{2}, -\frac{7}{2}; f|$

ket: $= |\frac{5}{2}, \frac{5}{2}; f\rangle\,, |\frac{5}{2}, \frac{3}{2}; f\rangle\,, |\frac{5}{2}, \frac{1}{2}; f\rangle\,, |\frac{5}{2}, -\frac{1}{2}; f\rangle\,, |\frac{5}{2}, -\frac{3}{2}; f\rangle\,, |\frac{5}{2}, -\frac{5}{2}; f\rangle\,, |\frac{7}{2}, \frac{7}{2}; f\rangle\,, |\frac{7}{2}, \frac{5}{2}; f\rangle\,, |\frac{7}{2}, \frac{3}{2}; f\rangle\,, |\frac{7}{2}, \frac{1}{2}; f\rangle\,, |\frac{7}{2}, -\frac{1}{2}; f\rangle\,, |\frac{7}{2}, -\frac{3}{2}; f\rangle\,, |\frac{7}{2}, -\frac{5}{2}; f\rangle\,, |\frac{7}{2}, -\frac{7}{2}; f\rangle$

Table 10: (f,f) block.

No.	multipole	matrix
829	symmetry	1

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_0^{(a)}(A_1)$	$\begin{bmatrix} \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} \end{bmatrix}$
830	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_2^{(a)}(A_1)$	$\begin{pmatrix} -\frac{5\sqrt{42}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}}{98} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{98} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{2\sqrt{42}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{98} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{2\sqrt{42}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{98} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{98} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}}{98} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{5\sqrt{7}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{588} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{196} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{14}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{25\sqrt{42}}{588} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{14}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{25\sqrt{42}}{588} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{196} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{588} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{84} \end{pmatrix}$
831	symmetry	$\sqrt{3}xz$

continued ...

Table 10

No.	multipole	matrix
832	symmetry	$\sqrt{3}yz$

$\mathbb{Q}_{2,1}^{(a)}(E,1)$:

$$\begin{pmatrix}
0 & -\frac{3\sqrt{70}}{98} & 0 & 0 & 0 & 0 & \frac{5\sqrt{3}}{84} & 0 & -\frac{5\sqrt{7}}{196} & 0 & 0 & 0 & 0 & 0 \\
-\frac{3\sqrt{70}}{98} & 0 & -\frac{3\sqrt{7}}{49} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{588} & 0 & -\frac{11\sqrt{21}}{588} & 0 & 0 & 0 & 0 \\
0 & -\frac{3\sqrt{7}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{196} & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{49} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{70}}{196} & 0 & 0 \\
0 & 0 & 0 & \frac{3\sqrt{7}}{49} & 0 & \frac{3\sqrt{70}}{98} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{21}}{588} & 0 & \frac{\sqrt{105}}{588} & 0 \\
0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}}{196} & 0 & \frac{5\sqrt{3}}{84} \\
\frac{5\sqrt{3}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & \frac{\sqrt{105}}{588} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{2}}{28} & 0 & -\frac{5\sqrt{42}}{147} & 0 & 0 & 0 & 0 & 0 \\
-\frac{5\sqrt{7}}{196} & 0 & -\frac{\sqrt{70}}{196} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{147} & 0 & -\frac{5\sqrt{210}}{588} & 0 & 0 & 0 & 0 \\
0 & -\frac{11\sqrt{21}}{588} & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{210}}{588} & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & -\frac{\sqrt{42}}{84} & 0 & -\frac{11\sqrt{21}}{588} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{210}}{588} & 0 & 0 \\
0 & 0 & 0 & -\frac{\sqrt{70}}{196} & 0 & -\frac{5\sqrt{7}}{196} & 0 & 0 & 0 & 0 & \frac{5\sqrt{210}}{588} & 0 & \frac{5\sqrt{42}}{147} & 0 \\
0 & 0 & 0 & 0 & \frac{\sqrt{105}}{588} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{147} & 0 & \frac{5\sqrt{2}}{28} \\
0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{3}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{2}}{28} & 0
\end{pmatrix}$$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}^{(a)}_{2,2}(E,1)$	$\begin{bmatrix} 0 & \frac{3\sqrt{70}i}{98} & 0 & 0 & 0 & 0 & \frac{5\sqrt{3}i}{84} & 0 & \frac{5\sqrt{7}i}{196} & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{70}i}{98} & 0 & \frac{3\sqrt{7}i}{49} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{588} & 0 & \frac{11\sqrt{21}i}{588} & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{7}i}{49} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{196} & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}i}{49} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & \frac{\sqrt{70}i}{196} & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{7}i}{49} & 0 & -\frac{3\sqrt{70}i}{98} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{21}i}{588} & 0 & -\frac{\sqrt{105}i}{588} & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{70}i}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}i}{196} & 0 & -\frac{5\sqrt{3}i}{84} \\ -\frac{5\sqrt{3}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}i}{588} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{2}i}{28} & 0 & \frac{5\sqrt{42}i}{147} & 0 & 0 & 0 & 0 & 0 \\ -\frac{5\sqrt{7}i}{196} & 0 & \frac{\sqrt{70}i}{196} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}i}{147} & 0 & \frac{5\sqrt{210}i}{588} & 0 & 0 & 0 & 0 \\ 0 & -\frac{11\sqrt{21}i}{588} & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{210}i}{588} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & \frac{11\sqrt{21}i}{588} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{210}i}{588} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{70}i}{196} & 0 & \frac{5\sqrt{7}i}{196} & 0 & 0 & 0 & 0 & \frac{5\sqrt{210}i}{588} & 0 & -\frac{5\sqrt{42}i}{147} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{588} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{147} & 0 & -\frac{5\sqrt{2}i}{28} \\ 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{3}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{2}i}{28} & 0 \end{bmatrix}$
833	symmetry	$\sqrt{3}xy$

continued ...

Table 10

No.	multipole	matrix
834	$\mathbb{Q}_{2,1}^{(a)}(E,2)$	$\begin{pmatrix} 0 & 0 & \frac{3\sqrt{35}i}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{294} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{9\sqrt{7}i}{98} & 0 & 0 & \frac{\sqrt{15}i}{42} & 0 & 0 & 0 & \frac{2\sqrt{21}i}{147} & 0 & 0 & 0 \\ -\frac{3\sqrt{35}i}{98} & 0 & 0 & 0 & \frac{9\sqrt{7}i}{98} & 0 & 0 & \frac{\sqrt{210}i}{147} & 0 & 0 & 0 & \frac{\sqrt{70}i}{98} & 0 & 0 \\ 0 & -\frac{9\sqrt{7}i}{98} & 0 & 0 & 0 & \frac{3\sqrt{35}i}{98} & 0 & 0 & \frac{\sqrt{70}i}{98} & 0 & 0 & 0 & \frac{\sqrt{210}i}{147} & 0 \\ 0 & 0 & -\frac{9\sqrt{7}i}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{21}i}{147} & 0 & 0 & 0 & \frac{\sqrt{15}i}{42} \\ 0 & 0 & 0 & -\frac{3\sqrt{35}i}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{294} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}i}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{210}i}{147} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{70}i}{196} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{70}i}{98} & 0 & 0 & -\frac{5\sqrt{6}i}{84} & 0 & 0 & 0 & \frac{5\sqrt{210}i}{294} & 0 & 0 & 0 \\ -\frac{\sqrt{105}i}{294} & 0 & 0 & 0 & -\frac{2\sqrt{21}i}{147} & 0 & 0 & -\frac{5\sqrt{70}i}{196} & 0 & 0 & 0 & \frac{5\sqrt{210}i}{294} & 0 & 0 \\ 0 & -\frac{2\sqrt{21}i}{147} & 0 & 0 & 0 & -\frac{\sqrt{105}i}{294} & 0 & 0 & -\frac{5\sqrt{210}i}{294} & 0 & 0 & 0 & \frac{5\sqrt{70}i}{196} & 0 \\ 0 & 0 & -\frac{\sqrt{70}i}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{210}i}{294} & 0 & 0 & 0 & \frac{5\sqrt{6}i}{84} \\ 0 & 0 & 0 & -\frac{\sqrt{210}i}{147} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{70}i}{196} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}i}{84} & 0 & 0 \end{pmatrix}$
	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}^{(a)}_{2,2}(E,2)$	$\begin{pmatrix} 0 & 0 & -\frac{3\sqrt{35}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{294} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{9\sqrt{7}}{98} & 0 & 0 & \frac{\sqrt{15}}{42} & 0 & 0 & 0 & -\frac{2\sqrt{21}}{147} & 0 & 0 & 0 \\ -\frac{3\sqrt{35}}{98} & 0 & 0 & 0 & -\frac{9\sqrt{7}}{98} & 0 & 0 & \frac{\sqrt{210}}{147} & 0 & 0 & 0 & -\frac{\sqrt{70}}{98} & 0 & 0 \\ 0 & -\frac{9\sqrt{7}}{98} & 0 & 0 & 0 & -\frac{3\sqrt{35}}{98} & 0 & 0 & \frac{\sqrt{70}}{98} & 0 & 0 & 0 & -\frac{\sqrt{210}}{147} & 0 \\ 0 & 0 & -\frac{9\sqrt{7}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{21}}{147} & 0 & 0 & 0 & -\frac{\sqrt{15}}{42} \\ 0 & 0 & 0 & -\frac{3\sqrt{35}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{294} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{210}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{70}}{196} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{70}}{98} & 0 & 0 & -\frac{5\sqrt{6}}{84} & 0 & 0 & 0 & -\frac{5\sqrt{210}}{294} & 0 & 0 & 0 \\ -\frac{\sqrt{105}}{294} & 0 & 0 & 0 & \frac{2\sqrt{21}}{147} & 0 & 0 & -\frac{5\sqrt{70}}{196} & 0 & 0 & 0 & -\frac{5\sqrt{210}}{294} & 0 & 0 \\ 0 & -\frac{2\sqrt{21}}{147} & 0 & 0 & 0 & \frac{\sqrt{105}}{294} & 0 & 0 & -\frac{5\sqrt{210}}{294} & 0 & 0 & 0 & -\frac{5\sqrt{70}}{196} & 0 \\ 0 & 0 & -\frac{\sqrt{70}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{210}}{294} & 0 & 0 & 0 & -\frac{5\sqrt{6}}{84} \\ 0 & 0 & 0 & -\frac{\sqrt{210}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{70}}{196} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}}{84} & 0 & 0 \end{pmatrix}$
835	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_4^{(a)}(A_1,1)$	$\begin{pmatrix} \frac{\sqrt{77}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{462}}{539} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{77}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{4\sqrt{770}}{539} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{77}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{231}}{539} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{77}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{231}}{539} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{77}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{4\sqrt{770}}{539} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{462}}{539} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{77}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{5\sqrt{462}}{539} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{39\sqrt{77}}{1078} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{4\sqrt{770}}{539} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{77}}{1078} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{231}}{539} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{27\sqrt{77}}{1078} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{231}}{539} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{27\sqrt{77}}{1078} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{4\sqrt{770}}{539} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{77}}{1078} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{462}}{539} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{39\sqrt{77}}{1078} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{77}}{154} \end{pmatrix}$
836	symmetry	$\frac{\sqrt{70}yz\left(3x^2-y^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_4^{(a)}(A_1,2)$	$\begin{array}{cccccccccccccc} 0 & 0 & 0 & -\frac{\sqrt{11}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{33}i}{154} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}i}{22} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{11}i}{14} & -\frac{3\sqrt{462}i}{308} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{66}i}{308} & 0 \\ \frac{\sqrt{11}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}i}{308} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{462}i}{308} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{11}i}{22} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{11}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{33}i}{154} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{462}i}{308} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{154}i}{154} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{66}i}{308} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{22}i}{77} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{11}i}{22} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{33}i}{154} & \frac{3\sqrt{154}i}{154} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{22}i}{77} & 0 \\ \frac{5\sqrt{33}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{22}i}{77} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{154}i}{154} \\ 0 & \frac{\sqrt{11}i}{22} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{66}i}{308} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{22}i}{77} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{462}i}{308} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{154}i}{154} & 0 & 0 & 0 \end{array}$
837	symmetry	$\frac{\sqrt{70}xz\left(x^2-3y^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_4^{(a)}(A_2)$	$\begin{pmatrix} 0 & 0 & 0 & \frac{\sqrt{11}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{33}}{154} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{11}}{22} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}}{14} & -\frac{3\sqrt{462}}{308} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}}{308} & 0 \\ \frac{\sqrt{11}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}}{308} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{462}}{308} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{11}}{22} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{11}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{33}}{154} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{462}}{308} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{154}}{154} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{66}}{308} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{22}}{77} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{11}}{22} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{33}}{154} & \frac{3\sqrt{154}}{154} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{22}}{77} & 0 \\ \frac{5\sqrt{33}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{22}}{77} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{154}}{154} \\ 0 & \frac{\sqrt{11}}{22} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{66}}{308} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{22}}{77} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{462}}{308} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{154}}{154} & 0 & 0 & 0 \end{pmatrix}$
838	symmetry	$-\frac{\sqrt{10}xz\left(3x^2+3y^2-4z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_{4,1}^{(a)}(E,1)$	$\begin{pmatrix} 0 & \frac{\sqrt{154}}{98} & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{154} & 0 & \frac{5\sqrt{385}}{539} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{154}}{98} & 0 & -\frac{\sqrt{385}}{98} & 0 & 0 & 0 & 0 & \frac{13\sqrt{231}}{1078} & 0 & -\frac{\sqrt{1155}}{539} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{385}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}}{2156} & 0 & -\frac{\sqrt{2310}}{308} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{385}}{98} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{308} & 0 & -\frac{\sqrt{154}}{2156} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{385}}{98} & 0 & -\frac{\sqrt{154}}{98} & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}}{539} & 0 & \frac{13\sqrt{231}}{1078} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{154}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{385}}{539} & 0 & -\frac{\sqrt{165}}{154} \\ -\frac{\sqrt{165}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{110}}{154} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{13\sqrt{231}}{1078} & 0 & 0 & 0 & 0 & \frac{3\sqrt{110}}{154} & 0 & -\frac{3\sqrt{2310}}{1078} & 0 & 0 & 0 & 0 & 0 \\ \frac{5\sqrt{385}}{539} & 0 & -\frac{\sqrt{154}}{2156} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2310}}{1078} & 0 & -\frac{9\sqrt{462}}{1078} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{1155}}{539} & 0 & -\frac{\sqrt{2310}}{308} & 0 & 0 & 0 & 0 & -\frac{9\sqrt{462}}{1078} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2310}}{308} & 0 & -\frac{\sqrt{1155}}{539} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{462}}{1078} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{154}}{2156} & 0 & \frac{5\sqrt{385}}{539} & 0 & 0 & 0 & 0 & \frac{9\sqrt{462}}{1078} & 0 & \frac{3\sqrt{2310}}{1078} & 0 \\ 0 & 0 & 0 & 0 & \frac{13\sqrt{231}}{1078} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2310}}{1078} & 0 & -\frac{3\sqrt{110}}{154} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{110}}{154} & 0 \end{pmatrix}$
839	symmetry	$-\frac{\sqrt{10}yz\left(3x^2+3y^2-4z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_{4,2}^{(a)}(E,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{154}i}{98} & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{154} & 0 & -\frac{5\sqrt{385}i}{539} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{154}i}{98} & 0 & \frac{\sqrt{385}i}{98} & 0 & 0 & 0 & 0 & \frac{13\sqrt{231}i}{1078} & 0 & \frac{\sqrt{1155}i}{539} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{385}i}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}i}{2156} & 0 & \frac{\sqrt{2310}i}{308} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{385}i}{98} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{308} & 0 & \frac{\sqrt{154}i}{2156} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{385}i}{98} & 0 & \frac{\sqrt{154}i}{98} & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}i}{539} & 0 & -\frac{13\sqrt{231}i}{1078} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{154}i}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{385}i}{539} & 0 & \frac{\sqrt{165}i}{154} \\ \frac{\sqrt{165}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{110}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{13\sqrt{231}i}{1078} & 0 & 0 & 0 & 0 & \frac{3\sqrt{110}i}{154} & 0 & \frac{3\sqrt{2310}i}{1078} & 0 & 0 & 0 & 0 & 0 \\ \frac{5\sqrt{385}i}{539} & 0 & \frac{\sqrt{154}i}{2156} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2310}i}{1078} & 0 & \frac{9\sqrt{462}i}{1078} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{1155}i}{539} & 0 & \frac{\sqrt{2310}i}{308} & 0 & 0 & 0 & 0 & -\frac{9\sqrt{462}i}{1078} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2310}i}{308} & 0 & \frac{\sqrt{1155}i}{539} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{462}i}{1078} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{154}i}{2156} & 0 & -\frac{5\sqrt{385}i}{539} & 0 & 0 & 0 & 0 & \frac{9\sqrt{462}i}{1078} & 0 & -\frac{3\sqrt{2310}i}{1078} & 0 \\ 0 & 0 & 0 & 0 & \frac{13\sqrt{231}i}{1078} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2310}i}{1078} & 0 & \frac{3\sqrt{110}i}{154} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{110}i}{154} & 0 \end{bmatrix}$
840	symmetry	$-\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_{4,1}^{(a)}(E,2)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{11}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}i}{77} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{11}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{66}i}{77} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{231}i}{77} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{231}i}{77} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{11}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{66}i}{77} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{11}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}i}{77} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{231}i}{77} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{77}i}{154} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{2\sqrt{66}i}{77} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{165}i}{154} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}i}{77} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{165}i}{154} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{77}i}{154} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{77}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{110}i}{77} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{165}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{2\sqrt{66}i}{77} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{165}i}{154} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{231}i}{77} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{77}i}{154} & 0 & 0 & 0 & 0 \end{pmatrix}$
841	symmetry	$\frac{\sqrt{35}\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_{4,2}^{(a)}(E,2)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{11}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}}{77} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{11}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{66}}{77} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{231}}{77} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}}{77} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{11}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{66}}{77} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{11}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}}{77} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{231}}{77} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{77}}{154} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{2\sqrt{66}}{77} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{165}}{154} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}}{77} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{165}}{154} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{77}}{154} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{77}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{110}}{77} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{165}}{154} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{2\sqrt{66}}{77} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{165}}{154} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{231}}{77} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{77}}{154} & 0 & 0 & 0 & 0 \end{pmatrix}$
842	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_{4,1}^{(a)}(E,3)$	$\begin{pmatrix} 0 & 0 & -\frac{3\sqrt{154}i}{196} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{462}i}{539} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{770}i}{196} & 0 & 0 & -\frac{3\sqrt{66}i}{154} & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{1078} & 0 & 0 & 0 \\ \frac{3\sqrt{154}i}{196} & 0 & 0 & 0 & \frac{\sqrt{770}i}{196} & 0 & 0 & \frac{9\sqrt{231}i}{1078} & 0 & 0 & 0 & \frac{17\sqrt{77}i}{1078} & 0 & 0 \\ 0 & -\frac{\sqrt{770}i}{196} & 0 & 0 & 0 & -\frac{3\sqrt{154}i}{196} & 0 & 0 & \frac{17\sqrt{77}i}{1078} & 0 & 0 & 0 & \frac{9\sqrt{231}i}{1078} & 0 \\ 0 & 0 & -\frac{\sqrt{770}i}{196} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{1078} & 0 & 0 & 0 & -\frac{3\sqrt{66}i}{154} \\ 0 & 0 & 0 & \frac{3\sqrt{154}i}{196} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{462}i}{539} & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{66}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{165}i}{154} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{9\sqrt{231}i}{1078} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{77}i}{1078} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{17\sqrt{77}i}{1078} & 0 & 0 & \frac{3\sqrt{165}i}{154} & 0 & 0 & 0 & \frac{6\sqrt{231}i}{539} & 0 & 0 & 0 \\ \frac{5\sqrt{462}i}{539} & 0 & 0 & 0 & \frac{\sqrt{2310}i}{1078} & 0 & 0 & \frac{3\sqrt{77}i}{1078} & 0 & 0 & 0 & \frac{6\sqrt{231}i}{539} & 0 & 0 \\ 0 & \frac{\sqrt{2310}i}{1078} & 0 & 0 & 0 & \frac{5\sqrt{462}i}{539} & 0 & 0 & -\frac{6\sqrt{231}i}{539} & 0 & 0 & 0 & -\frac{3\sqrt{77}i}{1078} & 0 \\ 0 & 0 & -\frac{17\sqrt{77}i}{1078} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{6\sqrt{231}i}{539} & 0 & 0 & 0 & -\frac{3\sqrt{165}i}{154} \\ 0 & 0 & 0 & -\frac{9\sqrt{231}i}{1078} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{77}i}{1078} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{66}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{165}i}{154} & 0 & 0 \end{pmatrix}$
843	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_{4,2}^{(a)}(E,3)$	$\begin{pmatrix} 0 & 0 & \frac{3\sqrt{154}}{196} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{462}}{539} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{770}}{196} & 0 & 0 & -\frac{3\sqrt{66}}{154} & 0 & 0 & 0 & \frac{\sqrt{2310}}{1078} & 0 & 0 & 0 \\ \frac{3\sqrt{154}}{196} & 0 & 0 & 0 & -\frac{\sqrt{770}}{196} & 0 & 0 & \frac{9\sqrt{231}}{1078} & 0 & 0 & 0 & -\frac{17\sqrt{77}}{1078} & 0 & 0 \\ 0 & -\frac{\sqrt{770}}{196} & 0 & 0 & 0 & \frac{3\sqrt{154}}{196} & 0 & 0 & \frac{17\sqrt{77}}{1078} & 0 & 0 & 0 & -\frac{9\sqrt{231}}{1078} & 0 \\ 0 & 0 & -\frac{\sqrt{770}}{196} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{1078} & 0 & 0 & 0 & \frac{3\sqrt{66}}{154} \\ 0 & 0 & 0 & \frac{3\sqrt{154}}{196} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{462}}{539} & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{66}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{165}}{154} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{9\sqrt{231}}{1078} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{77}}{1078} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{17\sqrt{77}}{1078} & 0 & 0 & \frac{3\sqrt{165}}{154} & 0 & 0 & 0 & -\frac{6\sqrt{231}}{539} & 0 & 0 & 0 \\ \frac{5\sqrt{462}}{539} & 0 & 0 & 0 & -\frac{\sqrt{2310}}{1078} & 0 & 0 & \frac{3\sqrt{77}}{1078} & 0 & 0 & 0 & -\frac{6\sqrt{231}}{539} & 0 & 0 \\ 0 & \frac{\sqrt{2310}}{1078} & 0 & 0 & 0 & -\frac{5\sqrt{462}}{539} & 0 & 0 & -\frac{6\sqrt{231}}{539} & 0 & 0 & 0 & \frac{3\sqrt{77}}{1078} & 0 \\ 0 & 0 & -\frac{17\sqrt{77}}{1078} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{6\sqrt{231}}{539} & 0 & 0 & 0 & \frac{3\sqrt{165}}{154} \\ 0 & 0 & 0 & -\frac{9\sqrt{231}}{1078} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{77}}{1078} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{66}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{165}}{154} & 0 & 0 \end{pmatrix}$
844	symmetry	$-\frac{5x^6}{16} - \frac{15x^4y^2}{16} + \frac{45x^4z^2}{8} - \frac{15x^2y^4}{16} + \frac{45x^2y^2z^2}{4} - \frac{15x^2z^4}{2} - \frac{5y^6}{16} + \frac{45y^4z^2}{8} - \frac{15y^2z^4}{2} + z^6$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_6^{(a)}(A_1,1)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}}{154} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{154} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{154}}{154} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{154}}{154} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}}{154} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}}{154} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{462}}{924} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{77}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{462}}{924} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{1155}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{462}}{308} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{154}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{462}}{924} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{154}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{462}}{924} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{462}}{308} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{462}}{924} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{462}}{924} \end{pmatrix}$
845	symmetry	$\frac{\sqrt{462}(x-y)(x+y)\left(x^2-4xy+y^2\right)\left(x^2+4xy+y^2\right)}{32}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_6^{(a)}(A_1,2)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{42}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
846	symmetry	$-\frac{\sqrt{210}yz\left(3x^2-y^2\right)\left(3x^2+3y^2-8z^2\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_6^{(a)}(A_1,3)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{66}i}{44} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{22}i}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{231}i}{154} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{33}i}{22} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}i}{22} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}i}{154} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{22}i}{44} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}i}{44} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{231}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}i}{77} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{33}i}{22} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}i}{22} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{22}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{66}i}{44} & -\frac{\sqrt{77}i}{77} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{11}i}{22} & 0 \\ -\frac{\sqrt{66}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{11}i}{22} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}i}{77} \\ 0 & \frac{3\sqrt{22}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{33}i}{22} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}i}{22} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{231}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}i}{77} & 0 & 0 & 0 \end{pmatrix}$
847	symmetry	$\frac{\sqrt{462}xy\left(x^2-3y^2\right)\left(3x^2-y^2\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_6^{(a)}(A_2,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{42}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
848	symmetry	$-\frac{\sqrt{210}xz\left(x^2-3y^2\right)\left(3x^2+3y^2-8z^2\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_6^{(a)}(A_2,2)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}}{44} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{22}}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{231}}{154} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}}{22} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}}{22} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{231}}{154} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{22}}{44} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}}{44} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{231}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}}{77} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{33}}{22} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{11}}{22} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{22}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}}{44} & -\frac{\sqrt{77}}{77} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}}{22} & 0 \\ -\frac{\sqrt{66}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{11}}{22} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}}{77} \\ 0 & \frac{3\sqrt{22}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{33}}{22} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}}{22} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{231}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}}{77} & 0 & 0 & 0 \end{pmatrix}$
849	symmetry	$-\frac{3\sqrt{154}xz\left(x^4-10x^2y^2+5y^4\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_{6,1}^{(a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
850	symmetry	$\frac{3\sqrt{154}yz\left(5x^4-10x^2y^2+y^4\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_{6,2}^{(a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
851	symmetry	$\frac{\sqrt{21}xz\left(5x^4+10x^2y^2-20x^2z^2+5y^4-20y^2z^2+8z^4\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_{6,1}^{(a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{231}}{924} & 0 & -\frac{\sqrt{11}}{44} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{132} & 0 & \frac{5\sqrt{33}}{132} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}}{44} & 0 & -\frac{5\sqrt{66}}{132} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{66}}{132} & 0 & \frac{\sqrt{110}}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{33}}{132} & 0 & -\frac{\sqrt{165}}{132} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}}{44} & 0 & \frac{\sqrt{231}}{924} \\ \frac{\sqrt{231}}{924} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}}{308} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{165}}{132} & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}}{308} & 0 & \frac{\sqrt{66}}{66} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{11}}{44} & 0 & \frac{\sqrt{110}}{44} & 0 & 0 & 0 & 0 & \frac{\sqrt{66}}{66} & 0 & -\frac{\sqrt{330}}{132} & 0 & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{33}}{132} & 0 & -\frac{5\sqrt{66}}{132} & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{132} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{66}}{132} & 0 & \frac{5\sqrt{33}}{132} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{132} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{110}}{44} & 0 & -\frac{\sqrt{11}}{44} & 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{132} & 0 & -\frac{\sqrt{66}}{66} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{132} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}}{66} & 0 & \frac{\sqrt{154}}{308} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{231}}{924} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}}{308} & 0 \end{bmatrix}$
852	symmetry	$\frac{\sqrt{21}yz\left(5x^4+10x^2y^2-20x^2z^2+5y^4-20y^2z^2+8z^4\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_{6,2}^{(a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{231}i}{924} & 0 & \frac{\sqrt{11}i}{44} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{132} & 0 & -\frac{5\sqrt{33}i}{132} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}i}{44} & 0 & \frac{5\sqrt{66}i}{132} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{66}i}{132} & 0 & -\frac{\sqrt{110}i}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{33}i}{132} & 0 & \frac{\sqrt{165}i}{132} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}i}{44} & 0 & -\frac{\sqrt{231}i}{924} \\ -\frac{\sqrt{231}i}{924} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}i}{308} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{165}i}{132} & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}i}{308} & 0 & -\frac{\sqrt{66}i}{66} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{11}i}{44} & 0 & -\frac{\sqrt{110}i}{44} & 0 & 0 & 0 & 0 & \frac{\sqrt{66}i}{66} & 0 & \frac{\sqrt{330}i}{132} & 0 & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{33}i}{132} & 0 & \frac{5\sqrt{66}i}{132} & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{132} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{66}i}{132} & 0 & -\frac{5\sqrt{33}i}{132} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{132} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{110}i}{44} & 0 & \frac{\sqrt{11}i}{44} & 0 & 0 & 0 & 0 & \frac{\sqrt{330}i}{132} & 0 & \frac{\sqrt{66}i}{66} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{132} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}i}{66} & 0 & -\frac{\sqrt{154}i}{308} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{231}i}{924} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}i}{308} & 0 \end{bmatrix}$
853	symmetry	$\frac{3\sqrt{7}xy(x-y)(x+y)\left(x^2+y^2-10z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_{6,1}^{(a)}(E,3)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}i}{22} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{55}i}{22} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}i}{154} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{55}i}{22} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}i}{22} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{770}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{308} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{55}i}{22} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}i}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{33}i}{22} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}i}{44} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{308} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}i}{308} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{33}i}{22} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{55}i}{22} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}i}{44} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{770}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}i}{308} & 0 & 0 & 0 & 0 \end{pmatrix}$
854	symmetry	$-\frac{3\sqrt{7}\left(x^2+y^2-10z^2\right)\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_{6,2}^{(a)}(E,3)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}}{22} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{55}}{22} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}}{154} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{770}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{55}}{22} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{33}}{22} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{770}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{308} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{55}}{22} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{33}}{22} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{44} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{308} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{308} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{33}}{22} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{44} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{55}}{22} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{44} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{770}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{308} & 0 & 0 & 0 & 0 \end{pmatrix}$
855	symmetry	$\frac{\sqrt{210}xy\left(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_{6,1}^{(a)}(E,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{66}i}{66} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{462}i}{462} & 0 & 0 & 0 & -\frac{\sqrt{330}i}{66} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}i}{33} & 0 & 0 & 0 & \frac{\sqrt{11}i}{11} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{11}i}{11} & 0 & 0 & 0 & -\frac{\sqrt{33}i}{33} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{66} & 0 & 0 & 0 & \frac{\sqrt{462}i}{462} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{66}i}{66} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{462}i}{462} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}i}{462} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{33}i}{33} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}i}{22} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{11}i}{11} & 0 & 0 & -\frac{\sqrt{1155}i}{462} & 0 & 0 & 0 & \frac{\sqrt{33}i}{66} & 0 & 0 & 0 \\ -\frac{\sqrt{66}i}{66} & 0 & 0 & 0 & \frac{\sqrt{330}i}{66} & 0 & 0 & \frac{\sqrt{11}i}{22} & 0 & 0 & 0 & \frac{\sqrt{33}i}{66} & 0 & 0 \\ 0 & \frac{\sqrt{330}i}{66} & 0 & 0 & 0 & -\frac{\sqrt{66}i}{66} & 0 & 0 & -\frac{\sqrt{33}i}{66} & 0 & 0 & 0 & -\frac{\sqrt{11}i}{22} & 0 \\ 0 & 0 & -\frac{\sqrt{11}i}{11} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}i}{66} & 0 & 0 & 0 & \frac{\sqrt{1155}i}{462} \\ 0 & 0 & 0 & \frac{\sqrt{33}i}{33} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{11}i}{22} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{462}i}{462} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}i}{462} & 0 & 0 \end{bmatrix}$
856	symmetry	$\frac{\sqrt{210}(x-y)(x+y)\left(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4\right)}{32}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_{6,2}^{(a)}(E,4)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}}{66} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{462}}{462} & 0 & 0 & 0 & \frac{\sqrt{330}}{66} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}}{33} & 0 & 0 & 0 & -\frac{\sqrt{11}}{11} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{11}}{11} & 0 & 0 & 0 & \frac{\sqrt{33}}{33} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{66} & 0 & 0 & 0 & -\frac{\sqrt{462}}{462} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{66}}{66} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{462}}{462} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}}{462} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{33}}{33} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{11}}{22} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{11}}{11} & 0 & 0 & -\frac{\sqrt{1155}}{462} & 0 & 0 & 0 & -\frac{\sqrt{33}}{66} & 0 & 0 & 0 \\ -\frac{\sqrt{66}}{66} & 0 & 0 & 0 & -\frac{\sqrt{330}}{66} & 0 & 0 & \frac{\sqrt{11}}{22} & 0 & 0 & 0 & -\frac{\sqrt{33}}{66} & 0 & 0 \\ 0 & \frac{\sqrt{330}}{66} & 0 & 0 & 0 & \frac{\sqrt{66}}{66} & 0 & 0 & -\frac{\sqrt{33}}{66} & 0 & 0 & 0 & \frac{\sqrt{11}}{22} & 0 \\ 0 & 0 & -\frac{\sqrt{11}}{11} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}}{66} & 0 & 0 & 0 & -\frac{\sqrt{1155}}{462} \\ 0 & 0 & 0 & \frac{\sqrt{33}}{33} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{11}}{22} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{462}}{462} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}}{462} & 0 & 0 \end{pmatrix}$
857	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_2^{(1,-1;a)}(A_1)$	$\begin{pmatrix} -\frac{5\sqrt{21}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{15\sqrt{14}}{196} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{210}}{196} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{4\sqrt{21}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{98} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{4\sqrt{21}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{98} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{210}}{196} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{21}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{15\sqrt{14}}{196} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{15\sqrt{14}}{196} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{98} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{210}}{196} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{21}}{98} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{7}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{21}}{98} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{7}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{21}}{98} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{210}}{196} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{21}}{98} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{15\sqrt{14}}{196} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{98} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} \end{pmatrix}$
858	symmetry	$\sqrt{3}xz$

continued ...

Table 10

No.	multipole	matrix
859	symmetry	$\sqrt{3}yz$

$\mathbb{Q}_{2,1}^{(1,-1;a)}(E,1)$

$$\begin{bmatrix}
0 & -\frac{\sqrt{35}}{49} & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}}{56} & 0 & -\frac{15\sqrt{14}}{392} & 0 & 0 & 0 & 0 & 0 \\
-\frac{\sqrt{35}}{49} & 0 & -\frac{\sqrt{14}}{49} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{392} & 0 & -\frac{11\sqrt{42}}{392} & 0 & 0 & 0 & 0 \\
0 & -\frac{\sqrt{14}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}}{196} & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & \frac{\sqrt{14}}{49} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & -\frac{3\sqrt{35}}{196} & 0 & 0 \\
0 & 0 & 0 & \frac{\sqrt{14}}{49} & 0 & \frac{\sqrt{35}}{49} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{42}}{392} & 0 & \frac{\sqrt{210}}{392} & 0 \\
0 & 0 & 0 & 0 & \frac{\sqrt{35}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{15\sqrt{14}}{392} & 0 & \frac{5\sqrt{6}}{56} \\
\frac{5\sqrt{6}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & \frac{\sqrt{210}}{392} & 0 & 0 & 0 & 0 & \frac{3}{14} & 0 & \frac{2\sqrt{21}}{49} & 0 & 0 & 0 & 0 & 0 \\
-\frac{15\sqrt{14}}{392} & 0 & -\frac{3\sqrt{35}}{196} & 0 & 0 & 0 & 0 & \frac{2\sqrt{21}}{49} & 0 & \frac{\sqrt{105}}{98} & 0 & 0 & 0 & 0 \\
0 & -\frac{11\sqrt{42}}{392} & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{98} & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & -\frac{\sqrt{21}}{28} & 0 & -\frac{11\sqrt{42}}{392} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{98} & 0 & 0 \\
0 & 0 & 0 & -\frac{3\sqrt{35}}{196} & 0 & -\frac{15\sqrt{14}}{392} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{98} & 0 & -\frac{2\sqrt{21}}{49} & 0 \\
0 & 0 & 0 & 0 & \frac{\sqrt{210}}{392} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{21}}{49} & 0 & -\frac{3}{14} \\
0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3}{14} & 0
\end{bmatrix}$$

continued ...

Table 10

No.	multipole	matrix
860	$\mathbb{Q}_{2,2}^{(1,-1;a)}(E,1)$	$\begin{pmatrix} 0 & \frac{\sqrt{35}i}{49} & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}i}{56} & 0 & \frac{15\sqrt{14}i}{392} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{35}i}{49} & 0 & \frac{\sqrt{14}i}{49} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{392} & 0 & \frac{11\sqrt{42}i}{392} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{14}i}{49} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}i}{196} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{49} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & \frac{3\sqrt{35}i}{196} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{14}i}{49} & 0 & -\frac{\sqrt{35}i}{49} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{42}i}{392} & 0 & -\frac{\sqrt{210}i}{392} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{49} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{15\sqrt{14}i}{392} & 0 & -\frac{5\sqrt{6}i}{56} \\ -\frac{5\sqrt{6}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}i}{392} & 0 & 0 & 0 & 0 & \frac{3i}{14} & 0 & -\frac{2\sqrt{21}i}{49} & 0 & 0 & 0 & 0 & 0 \\ -\frac{15\sqrt{14}i}{392} & 0 & \frac{3\sqrt{35}i}{196} & 0 & 0 & 0 & 0 & \frac{2\sqrt{21}i}{49} & 0 & -\frac{\sqrt{105}i}{98} & 0 & 0 & 0 & 0 \\ 0 & -\frac{11\sqrt{42}i}{392} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{98} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & \frac{11\sqrt{42}i}{392} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{98} & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{35}i}{196} & 0 & \frac{15\sqrt{14}i}{392} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{98} & 0 & \frac{2\sqrt{21}i}{49} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{392} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{21}i}{49} & 0 & \frac{3i}{14} \\ 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3i}{14} & 0 \end{pmatrix}$
	symmetry	$\sqrt{3}xy$

continued ...

Table 10

No.	multipole	matrix
861	$\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)$	$\begin{pmatrix} 0 & 0 & \frac{\sqrt{70}i}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{196} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{14}i}{98} & 0 & 0 & \frac{\sqrt{30}i}{28} & 0 & 0 & 0 & \frac{\sqrt{42}i}{49} & 0 & 0 & 0 \\ -\frac{\sqrt{70}i}{98} & 0 & 0 & 0 & \frac{3\sqrt{14}i}{98} & 0 & 0 & \frac{\sqrt{105}i}{49} & 0 & 0 & 0 & \frac{3\sqrt{35}i}{98} & 0 & 0 \\ 0 & -\frac{3\sqrt{14}i}{98} & 0 & 0 & 0 & \frac{\sqrt{70}i}{98} & 0 & 0 & \frac{3\sqrt{35}i}{98} & 0 & 0 & 0 & \frac{\sqrt{105}i}{49} & 0 \\ 0 & 0 & -\frac{3\sqrt{14}i}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{49} & 0 & 0 & 0 & \frac{\sqrt{30}i}{28} \\ 0 & 0 & 0 & -\frac{\sqrt{70}i}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{196} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{105}i}{49} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}i}{98} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{35}i}{98} & 0 & 0 & \frac{\sqrt{3}i}{14} & 0 & 0 & 0 & -\frac{\sqrt{105}i}{49} & 0 & 0 & 0 \\ -\frac{\sqrt{210}i}{196} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{49} & 0 & 0 & \frac{3\sqrt{35}i}{98} & 0 & 0 & 0 & -\frac{\sqrt{105}i}{49} & 0 & 0 \\ 0 & -\frac{\sqrt{42}i}{49} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{196} & 0 & 0 & \frac{\sqrt{105}i}{49} & 0 & 0 & 0 & -\frac{3\sqrt{35}i}{98} & 0 \\ 0 & 0 & -\frac{3\sqrt{35}i}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{49} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{14} \\ 0 & 0 & 0 & -\frac{\sqrt{105}i}{49} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}i}{98} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{14} & 0 & 0 \end{pmatrix}$
	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)$	$\begin{pmatrix} 0 & 0 & -\frac{\sqrt{70}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{196} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{14}}{98} & 0 & 0 & \frac{\sqrt{30}}{28} & 0 & 0 & 0 & -\frac{\sqrt{42}}{49} & 0 & 0 & 0 \\ -\frac{\sqrt{70}}{98} & 0 & 0 & 0 & -\frac{3\sqrt{14}}{98} & 0 & 0 & \frac{\sqrt{105}}{49} & 0 & 0 & 0 & -\frac{3\sqrt{35}}{98} & 0 & 0 \\ 0 & -\frac{3\sqrt{14}}{98} & 0 & 0 & 0 & -\frac{\sqrt{70}}{98} & 0 & 0 & \frac{3\sqrt{35}}{98} & 0 & 0 & 0 & -\frac{\sqrt{105}}{49} & 0 \\ 0 & 0 & -\frac{3\sqrt{14}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{49} & 0 & 0 & 0 & -\frac{\sqrt{30}}{28} \\ 0 & 0 & 0 & -\frac{\sqrt{70}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{196} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{105}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}}{98} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{35}}{98} & 0 & 0 & \frac{\sqrt{3}}{14} & 0 & 0 & 0 & \frac{\sqrt{105}}{49} & 0 & 0 & 0 \\ -\frac{\sqrt{210}}{196} & 0 & 0 & 0 & \frac{\sqrt{42}}{49} & 0 & 0 & \frac{3\sqrt{35}}{98} & 0 & 0 & 0 & \frac{\sqrt{105}}{49} & 0 & 0 \\ 0 & -\frac{\sqrt{42}}{49} & 0 & 0 & 0 & \frac{\sqrt{210}}{196} & 0 & 0 & \frac{\sqrt{105}}{49} & 0 & 0 & 0 & \frac{3\sqrt{35}}{98} & 0 \\ 0 & 0 & -\frac{3\sqrt{35}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{49} & 0 & 0 & 0 & \frac{\sqrt{3}}{14} \\ 0 & 0 & 0 & -\frac{\sqrt{105}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}}{98} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{14} & 0 & 0 \end{pmatrix}$
862	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_4^{(1,-1;a)}(A_1,1)$	$\begin{pmatrix} \frac{\sqrt{21}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}}{98} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{210}}{147} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{2\sqrt{21}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}}{98} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{2\sqrt{21}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}}{98} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{210}}{147} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}}{98} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{5\sqrt{14}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{13\sqrt{21}}{147} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{2\sqrt{210}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{49} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{7}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{21}}{49} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{7}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{21}}{49} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{2\sqrt{210}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{49} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{13\sqrt{21}}{147} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{21} \end{pmatrix}$
863	symmetry	$\frac{\sqrt{70}yz\left(3x^2-y^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_4^{(1,-1;a)}(A_1,2)$	$\begin{pmatrix} 0 & 0 & 0 & -\frac{\sqrt{3}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{21} & -\frac{3\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{56} & 0 \\ \frac{\sqrt{3}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}i}{56} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{21} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{6}i}{21} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5i}{28} & -\frac{\sqrt{42}i}{21} & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{6}i}{21} & 0 \\ \frac{5i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{6}i}{21} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{21} \\ 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{6}i}{21} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{21} & 0 & 0 & 0 \end{pmatrix}$
864	symmetry	$\frac{\sqrt{70}xz\left(x^2-3y^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_4^{(1,-1;a)}(A_2)$	$\begin{pmatrix} 0 & 0 & 0 & \frac{\sqrt{3}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{21} & -\frac{3\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{56} & 0 \\ \frac{\sqrt{3}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{56} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{21} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{6}}{21} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{5}{28} & -\frac{\sqrt{42}}{21} & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{6}}{21} & 0 \\ \frac{5}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{6}}{21} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{21} \\ 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{6}}{21} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{21} & 0 & 0 & 0 \end{pmatrix}$
865	symmetry	$-\frac{\sqrt{10}xz\left(3x^2+3y^2-4z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_{4,1}^{(1,-1;a)}(E,1)$	$\begin{pmatrix} 0 & \frac{\sqrt{42}}{147} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{28} & 0 & \frac{5\sqrt{105}}{294} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{42}}{147} & 0 & -\frac{\sqrt{105}}{147} & 0 & 0 & 0 & 0 & \frac{13\sqrt{7}}{196} & 0 & -\frac{\sqrt{35}}{98} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{1176} & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{147} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & -\frac{\sqrt{42}}{1176} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{105}}{147} & 0 & -\frac{\sqrt{42}}{147} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{98} & 0 & \frac{13\sqrt{7}}{196} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{105}}{294} & 0 & -\frac{\sqrt{5}}{28} \\ -\frac{\sqrt{5}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{21} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{13\sqrt{7}}{196} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{21} & 0 & \frac{\sqrt{70}}{49} & 0 & 0 & 0 & 0 & 0 \\ \frac{5\sqrt{105}}{294} & 0 & -\frac{\sqrt{42}}{1176} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{49} & 0 & \frac{3\sqrt{14}}{49} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{35}}{98} & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}}{49} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & -\frac{\sqrt{35}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{49} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{42}}{1176} & 0 & \frac{5\sqrt{105}}{294} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{49} & 0 & -\frac{\sqrt{70}}{49} & 0 \\ 0 & 0 & 0 & 0 & \frac{13\sqrt{7}}{196} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{49} & 0 & \frac{\sqrt{30}}{21} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{21} & 0 \end{pmatrix}$
866	symmetry	$-\frac{\sqrt{10}yz\left(3x^2+3y^2-4z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_{4,2}^{(1,-1;a)}(E,1)$	$\begin{pmatrix} 0 & -\frac{\sqrt{42}i}{147} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{28} & 0 & -\frac{5\sqrt{105}i}{294} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{42}i}{147} & 0 & \frac{\sqrt{105}i}{147} & 0 & 0 & 0 & 0 & \frac{13\sqrt{7}i}{196} & 0 & \frac{\sqrt{35}i}{98} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}i}{147} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{1176} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{147} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & \frac{\sqrt{42}i}{1176} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{105}i}{147} & 0 & \frac{\sqrt{42}i}{147} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{98} & 0 & -\frac{13\sqrt{7}i}{196} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{147} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{105}i}{294} & 0 & \frac{\sqrt{5}i}{28} \\ \frac{\sqrt{5}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{13\sqrt{7}i}{196} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{21} & 0 & -\frac{\sqrt{70}i}{49} & 0 & 0 & 0 & 0 & 0 \\ \frac{5\sqrt{105}i}{294} & 0 & \frac{\sqrt{42}i}{1176} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{49} & 0 & -\frac{3\sqrt{14}i}{49} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{35}i}{98} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}i}{49} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & \frac{\sqrt{35}i}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}i}{49} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{42}i}{1176} & 0 & -\frac{5\sqrt{105}i}{294} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{49} & 0 & \frac{\sqrt{70}i}{49} & 0 \\ 0 & 0 & 0 & 0 & \frac{13\sqrt{7}i}{196} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{49} & 0 & -\frac{\sqrt{30}i}{21} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{21} & 0 \end{pmatrix}$
867	symmetry	$-\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_{4,1}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{42} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{7} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{3}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{7} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{42} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{21} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{7} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{7} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{7} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{21} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{7} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{7} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{7} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{21} & 0 & 0 & 0 & 0 \end{bmatrix}$
868	symmetry	$\frac{\sqrt{35}\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_{4,2}^{(1,-1;a)}(E,2)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{42} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{7} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{3}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{7} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{42} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{21} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{7} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{7} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{21} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{30}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{7} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{7} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{21} & 0 & 0 & 0 & 0 \end{pmatrix}$
869	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_{4,1}^{(1,-1;a)}(E,3)$	$\begin{pmatrix} 0 & 0 & -\frac{\sqrt{42}i}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}i}{98} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{210}i}{294} & 0 & 0 & -\frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{70}i}{196} & 0 & 0 & 0 \\ \frac{\sqrt{42}i}{98} & 0 & 0 & 0 & \frac{\sqrt{210}i}{294} & 0 & 0 & \frac{9\sqrt{7}i}{196} & 0 & 0 & 0 & \frac{17\sqrt{21}i}{588} & 0 & 0 \\ 0 & -\frac{\sqrt{210}i}{294} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{98} & 0 & 0 & \frac{17\sqrt{21}i}{588} & 0 & 0 & 0 & \frac{9\sqrt{7}i}{196} & 0 \\ 0 & 0 & -\frac{\sqrt{210}i}{294} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{196} & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{28} \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}i}{98} & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{7} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{9\sqrt{7}i}{196} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{147} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{17\sqrt{21}i}{588} & 0 & 0 & -\frac{\sqrt{5}i}{7} & 0 & 0 & 0 & -\frac{4\sqrt{7}i}{49} & 0 & 0 & 0 \\ \frac{5\sqrt{14}i}{98} & 0 & 0 & 0 & \frac{\sqrt{70}i}{196} & 0 & 0 & -\frac{\sqrt{21}i}{147} & 0 & 0 & 0 & -\frac{4\sqrt{7}i}{49} & 0 & 0 \\ 0 & \frac{\sqrt{70}i}{196} & 0 & 0 & 0 & \frac{5\sqrt{14}i}{98} & 0 & 0 & \frac{4\sqrt{7}i}{49} & 0 & 0 & 0 & \frac{\sqrt{21}i}{147} & 0 \\ 0 & 0 & -\frac{17\sqrt{21}i}{588} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{4\sqrt{7}i}{49} & 0 & 0 & 0 & \frac{\sqrt{5}i}{7} \\ 0 & 0 & 0 & -\frac{9\sqrt{7}i}{196} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{147} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{7} & 0 & 0 \end{pmatrix}$
870	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_{4,2}^{(1,-1;a)}(E,3)$	$\begin{matrix} 0 & 0 & \frac{\sqrt{42}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}}{98} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{210}}{294} & 0 & 0 & -\frac{3\sqrt{2}}{28} & 0 & 0 & 0 & \frac{\sqrt{70}}{196} & 0 & 0 & 0 \\ \frac{\sqrt{42}}{98} & 0 & 0 & 0 & -\frac{\sqrt{210}}{294} & 0 & 0 & \frac{9\sqrt{7}}{196} & 0 & 0 & 0 & -\frac{17\sqrt{21}}{588} & 0 & 0 \\ 0 & -\frac{\sqrt{210}}{294} & 0 & 0 & 0 & \frac{\sqrt{42}}{98} & 0 & 0 & \frac{17\sqrt{21}}{588} & 0 & 0 & 0 & -\frac{9\sqrt{7}}{196} & 0 \\ 0 & 0 & -\frac{\sqrt{210}}{294} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{196} & 0 & 0 & 0 & \frac{3\sqrt{2}}{28} \\ 0 & 0 & 0 & \frac{\sqrt{42}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}}{98} & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{7} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{9\sqrt{7}}{196} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{147} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{17\sqrt{21}}{588} & 0 & 0 & -\frac{\sqrt{5}}{7} & 0 & 0 & 0 & \frac{4\sqrt{7}}{49} & 0 & 0 & 0 \\ \frac{5\sqrt{14}}{98} & 0 & 0 & 0 & -\frac{\sqrt{70}}{196} & 0 & 0 & -\frac{\sqrt{21}}{147} & 0 & 0 & 0 & \frac{4\sqrt{7}}{49} & 0 & 0 \\ 0 & \frac{\sqrt{70}}{196} & 0 & 0 & 0 & -\frac{5\sqrt{14}}{98} & 0 & 0 & \frac{4\sqrt{7}}{49} & 0 & 0 & 0 & -\frac{\sqrt{21}}{147} & 0 \\ 0 & 0 & -\frac{17\sqrt{21}}{588} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{4\sqrt{7}}{49} & 0 & 0 & 0 & -\frac{\sqrt{5}}{7} \\ 0 & 0 & 0 & -\frac{9\sqrt{7}}{196} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{147} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{7} & 0 & 0 \end{matrix}$
871	symmetry	$-\frac{5x^6}{16} - \frac{15x^4y^2}{16} + \frac{45x^4z^2}{8} - \frac{15x^2y^4}{16} + \frac{45x^2y^2z^2}{4} - \frac{15x^2z^4}{2} - \frac{5y^6}{16} + \frac{45y^4z^2}{8} - \frac{15y^2z^4}{2} + z^6$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_6^{(1,-1;a)}(A_1,1)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{462}}{924} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{770}}{308} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{231}}{462} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{231}}{462} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}}{308} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{462}}{924} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{462}}{924} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{77}}{154} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{770}}{308} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{77}}{154} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{231}}{462} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{77}}{154} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{231}}{462} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{77}}{154} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{770}}{308} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{77}}{154} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{462}}{924} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{77}}{154} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}}{154} \end{pmatrix}$
872	symmetry	$\frac{\sqrt{462}(x-y)(x+y)\left(x^2-4xy+y^2\right)\left(x^2+4xy+y^2\right)}{32}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_6^{(1,-1;a)}(A_1,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
873	symmetry	$-\frac{\sqrt{210}yz\left(3x^2-y^2\right)\left(3x^2+3y^2-8z^2\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_6^{(1,-1;a)}(A_1,3)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{11}i}{44} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}i}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}i}{308} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}i}{44} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}i}{44} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}i}{308} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{33}i}{44} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}i}{44} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{154}i}{308} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{462}i}{77} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{22}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{66}i}{22} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{33}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{11}i}{44} & \frac{\sqrt{462}i}{77} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}i}{22} & 0 \\ -\frac{\sqrt{11}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}i}{22} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{462}i}{77} \\ 0 & \frac{\sqrt{33}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{22}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{66}i}{22} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{154}i}{308} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{462}i}{77} & 0 & 0 & 0 \end{pmatrix}$
874	symmetry	$\frac{\sqrt{462}xy\left(x^2-3y^2\right)\left(3x^2-y^2\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_6^{(1,-1;a)}(A_2,1)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
875	symmetry	$-\frac{\sqrt{210}xz\left(x^2-3y^2\right)\left(3x^2+3y^2-8z^2\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_6^{(1,-1;a)}(A_2,2)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}}{44} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{33}}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}}{308} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}}{44} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}}{44} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}}{308} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{33}}{44} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}}{44} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{154}}{308} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{462}}{77} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{22}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}}{22} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{33}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}}{44} & \frac{\sqrt{462}}{77} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{66}}{22} & 0 \\ -\frac{\sqrt{11}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}}{22} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{462}}{77} \\ 0 & \frac{\sqrt{33}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{22}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{66}}{22} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{154}}{308} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{462}}{77} & 0 & 0 & 0 \end{pmatrix}$
876	symmetry	$-\frac{3\sqrt{154}xz\left(x^4-10x^2y^2+5y^4\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_{6,1}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{14} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
877	symmetry	$\frac{3\sqrt{154}yz\left(5x^4-10x^2y^2+y^4\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_{6,2}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{84} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{14} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
878	symmetry	$\frac{\sqrt{21}xz\left(5x^4+10x^2y^2-20x^2z^2+5y^4-20y^2z^2+8z^4\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_{6,1}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}}{1848} & 0 & -\frac{\sqrt{66}}{264} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}}{264} & 0 & \frac{5\sqrt{22}}{264} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{132} & 0 & -\frac{5\sqrt{11}}{132} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{11}}{132} & 0 & \frac{\sqrt{165}}{132} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{22}}{264} & 0 & -\frac{\sqrt{110}}{264} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}}{264} & 0 & \frac{\sqrt{154}}{1848} \\ \frac{\sqrt{154}}{1848} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{231}}{154} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{110}}{264} & 0 & 0 & 0 & 0 & \frac{\sqrt{231}}{154} & 0 & -\frac{\sqrt{11}}{11} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{66}}{264} & 0 & \frac{\sqrt{165}}{132} & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}}{11} & 0 & \frac{\sqrt{55}}{22} & 0 & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{22}}{264} & 0 & -\frac{5\sqrt{11}}{132} & 0 & 0 & 0 & 0 & \frac{\sqrt{55}}{22} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{11}}{132} & 0 & \frac{5\sqrt{22}}{264} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{55}}{22} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{165}}{132} & 0 & -\frac{\sqrt{66}}{264} & 0 & 0 & 0 & 0 & -\frac{\sqrt{55}}{22} & 0 & \frac{\sqrt{11}}{11} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{110}}{264} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{11}}{11} & 0 & -\frac{\sqrt{231}}{154} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}}{1848} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}}{154} & 0 \end{bmatrix}$
879	symmetry	$\frac{\sqrt{21}yz\left(5x^4+10x^2y^2-20x^2z^2+5y^4-20y^2z^2+8z^4\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_{6,2}^{(1,-1;a)}(E,2)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}i}{1848} & 0 & \frac{\sqrt{66}i}{264} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}i}{264} & 0 & -\frac{5\sqrt{22}i}{264} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}i}{132} & 0 & \frac{5\sqrt{11}i}{132} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{11}i}{132} & 0 & -\frac{\sqrt{165}i}{132} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{22}i}{264} & 0 & \frac{\sqrt{110}i}{264} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}i}{264} & 0 & -\frac{\sqrt{154}i}{1848} \\ -\frac{\sqrt{154}i}{1848} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{110}i}{264} & 0 & 0 & 0 & 0 & \frac{\sqrt{231}i}{154} & 0 & \frac{\sqrt{11}i}{11} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{66}i}{264} & 0 & -\frac{\sqrt{165}i}{132} & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}i}{11} & 0 & -\frac{\sqrt{55}i}{22} & 0 & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{22}i}{264} & 0 & \frac{5\sqrt{11}i}{132} & 0 & 0 & 0 & 0 & \frac{\sqrt{55}i}{22} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{11}i}{132} & 0 & -\frac{5\sqrt{22}i}{264} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{55}i}{22} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{165}i}{132} & 0 & \frac{\sqrt{66}i}{264} & 0 & 0 & 0 & 0 & -\frac{\sqrt{55}i}{22} & 0 & -\frac{\sqrt{11}i}{11} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{110}i}{264} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{11}i}{11} & 0 & \frac{\sqrt{231}i}{154} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}i}{1848} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}i}{154} & 0 \end{pmatrix}$
880	symmetry	$\frac{3\sqrt{7}xy(x-y)(x+y)\left(x^2+y^2-10z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_{6,1}^{(1,-1;a)}(E,3)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}i}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}i}{132} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}i}{462} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}i}{462} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}i}{132} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}i}{44} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{1155}i}{462} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{385}i}{154} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{132} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}i}{22} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}i}{22} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{385}i}{154} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{385}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{22}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{33}i}{22} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{330}i}{132} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{33}i}{22} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{1155}i}{462} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{385}i}{154} & 0 & 0 & 0 & 0 \end{pmatrix}$
881	symmetry	$-\frac{3\sqrt{7}\left(x^2+y^2-10z^2\right)\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_{6,2}^{(1,-1;a)}(E,3)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{132} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}}{462} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{462} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{132} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{44} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{1155}}{462} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{385}}{154} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{132} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}}{22} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}}{22} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{385}}{154} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{385}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{22}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}}{22} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{330}}{132} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}}{22} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{1155}}{462} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{385}}{154} & 0 & 0 & 0 & 0 \end{pmatrix}$
882	symmetry	$\frac{\sqrt{210}xy\left(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_{6,1}^{(1,-1;a)}(E,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{11}i}{66} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}i}{462} & 0 & 0 & 0 & -\frac{\sqrt{55}i}{66} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}i}{66} & 0 & 0 & 0 & \frac{\sqrt{66}i}{66} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{66}i}{66} & 0 & 0 & 0 & -\frac{\sqrt{22}i}{66} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{55}i}{66} & 0 & 0 & 0 & \frac{\sqrt{77}i}{462} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{11}i}{66} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{77}i}{462} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}i}{154} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{22}i}{66} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{66}i}{22} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{66}i}{66} & 0 & 0 & \frac{\sqrt{770}i}{154} & 0 & 0 & 0 & -\frac{\sqrt{22}i}{22} & 0 & 0 & 0 \\ -\frac{\sqrt{11}i}{66} & 0 & 0 & 0 & \frac{\sqrt{55}i}{66} & 0 & 0 & -\frac{\sqrt{66}i}{22} & 0 & 0 & 0 & -\frac{\sqrt{22}i}{22} & 0 & 0 \\ 0 & \frac{\sqrt{55}i}{66} & 0 & 0 & 0 & -\frac{\sqrt{11}i}{66} & 0 & 0 & \frac{\sqrt{22}i}{22} & 0 & 0 & 0 & \frac{\sqrt{66}i}{22} & 0 \\ 0 & 0 & -\frac{\sqrt{66}i}{66} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}i}{22} & 0 & 0 & 0 & -\frac{\sqrt{770}i}{154} \\ 0 & 0 & 0 & \frac{\sqrt{22}i}{66} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}i}{22} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{77}i}{462} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{770}i}{154} & 0 & 0 \end{bmatrix}$
883	symmetry	$\frac{\sqrt{210}(x-y)(x+y)\left(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4\right)}{32}$

continued ...

Table 10

No.	multipole	matrix
884	$\mathbb{Q}_{6,2}^{(1,-1;a)}(E,4)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}}{66} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}}{462} & 0 & 0 & 0 & \frac{\sqrt{55}}{66} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}}{66} & 0 & 0 & 0 & -\frac{\sqrt{66}}{66} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{66}}{66} & 0 & 0 & 0 & \frac{\sqrt{22}}{66} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{55}}{66} & 0 & 0 & 0 & -\frac{\sqrt{77}}{462} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{11}}{66} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{77}}{462} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{770}}{154} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{22}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}}{22} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{66}}{66} & 0 & 0 & \frac{\sqrt{770}}{154} & 0 & 0 & 0 & \frac{\sqrt{22}}{22} & 0 & 0 & 0 \\ -\frac{\sqrt{11}}{66} & 0 & 0 & 0 & -\frac{\sqrt{55}}{66} & 0 & 0 & -\frac{\sqrt{66}}{22} & 0 & 0 & 0 & \frac{\sqrt{22}}{22} & 0 & 0 \\ 0 & \frac{\sqrt{55}}{66} & 0 & 0 & 0 & \frac{\sqrt{11}}{66} & 0 & 0 & \frac{\sqrt{22}}{22} & 0 & 0 & 0 & -\frac{\sqrt{66}}{22} & 0 \\ 0 & 0 & -\frac{\sqrt{66}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{22} & 0 & 0 & 0 & \frac{\sqrt{770}}{154} \\ 0 & 0 & 0 & \frac{\sqrt{22}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}}{22} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{77}}{462} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{770}}{154} & 0 & 0 \end{pmatrix}$
	symmetry	1

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_0^{(1,1;a)}(A_1)$	$\begin{bmatrix} -\frac{\sqrt{42}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{42}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} \end{bmatrix}$
885	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_2^{(1,1;a)}(A_1)$	$\begin{pmatrix} \frac{15\sqrt{7}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{147} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{7}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{49} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{6\sqrt{7}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{21}}{147} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{6\sqrt{7}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{21}}{147} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{49} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{15\sqrt{7}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{147} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{5\sqrt{42}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{98} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{70}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{98} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{2\sqrt{21}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}}{98} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{2\sqrt{21}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}}{98} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{98} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{98} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} \end{pmatrix}$
886	symmetry	$\sqrt{3}xz$

continued ...

Table 10

No.	multipole	matrix
887	symmetry	$\sqrt{3}yz$

$\mathbb{Q}_{2,1}^{(1,1;a)}(E,1)$

$$\begin{pmatrix}
0 & \frac{3\sqrt{105}}{98} & 0 & 0 & 0 & 0 & \frac{5\sqrt{2}}{42} & 0 & -\frac{5\sqrt{42}}{294} & 0 & 0 & 0 & 0 & 0 \\
\frac{3\sqrt{105}}{98} & 0 & \frac{3\sqrt{42}}{98} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{294} & 0 & -\frac{11\sqrt{14}}{294} & 0 & 0 & 0 & 0 \\
0 & \frac{3\sqrt{42}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{147} & 0 & -\frac{\sqrt{7}}{21} & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & -\frac{3\sqrt{42}}{98} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{21} & 0 & -\frac{\sqrt{105}}{147} & 0 & 0 \\
0 & 0 & 0 & -\frac{3\sqrt{42}}{98} & 0 & -\frac{3\sqrt{105}}{98} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{14}}{294} & 0 & \frac{\sqrt{70}}{294} & 0 \\
0 & 0 & 0 & 0 & -\frac{3\sqrt{105}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{294} & 0 & \frac{5\sqrt{2}}{42} \\
\frac{5\sqrt{2}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & \frac{\sqrt{70}}{294} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{14} & 0 & -\frac{2\sqrt{7}}{49} & 0 & 0 & 0 & 0 & 0 \\
-\frac{5\sqrt{42}}{294} & 0 & -\frac{\sqrt{105}}{147} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{7}}{49} & 0 & -\frac{\sqrt{35}}{98} & 0 & 0 & 0 & 0 \\
0 & -\frac{11\sqrt{14}}{294} & 0 & -\frac{\sqrt{7}}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{98} & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & -\frac{\sqrt{7}}{21} & 0 & -\frac{11\sqrt{14}}{294} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{98} & 0 & 0 \\
0 & 0 & 0 & -\frac{\sqrt{105}}{147} & 0 & -\frac{5\sqrt{42}}{294} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{98} & 0 & \frac{2\sqrt{7}}{49} & 0 \\
0 & 0 & 0 & 0 & \frac{\sqrt{70}}{294} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{7}}{49} & 0 & \frac{\sqrt{3}}{14} \\
0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{2}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{14} & 0
\end{pmatrix}$$

continued ...

Table 10

No.	multipole	matrix
888	$\mathbb{Q}_{2,2}^{(1,1;a)}(E,1)$	$\begin{pmatrix} 0 & -\frac{3\sqrt{105}i}{98} & 0 & 0 & 0 & 0 & \frac{5\sqrt{2}i}{42} & 0 & \frac{5\sqrt{42}i}{294} & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{105}i}{98} & 0 & -\frac{3\sqrt{42}i}{98} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{294} & 0 & \frac{11\sqrt{14}i}{294} & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{42}i}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{147} & 0 & \frac{\sqrt{7}i}{21} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{42}i}{98} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{21} & 0 & \frac{\sqrt{105}i}{147} & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{42}i}{98} & 0 & \frac{3\sqrt{105}i}{98} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{14}i}{294} & 0 & -\frac{\sqrt{70}i}{294} & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{105}i}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}i}{294} & 0 & -\frac{5\sqrt{2}i}{42} \\ -\frac{5\sqrt{2}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{70}i}{294} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{14} & 0 & \frac{2\sqrt{7}i}{49} & 0 & 0 & 0 & 0 & 0 \\ -\frac{5\sqrt{42}i}{294} & 0 & \frac{\sqrt{105}i}{147} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{7}i}{49} & 0 & \frac{\sqrt{35}i}{98} & 0 & 0 & 0 & 0 \\ 0 & -\frac{11\sqrt{14}i}{294} & 0 & \frac{\sqrt{7}i}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{98} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}i}{21} & 0 & \frac{11\sqrt{14}i}{294} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{98} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{105}i}{147} & 0 & \frac{5\sqrt{42}i}{294} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{98} & 0 & -\frac{2\sqrt{7}i}{49} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{294} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{7}i}{49} & 0 & -\frac{\sqrt{3}i}{14} \\ 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{2}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{14} & 0 \end{pmatrix}$
	symmetry	$\sqrt{3}xy$

continued ...

Table 10

No.	multipole	matrix
889	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

$\mathbb{Q}_{2,1}^{(1,1;a)}(E,2)$:

$$\begin{bmatrix}
0 & 0 & -\frac{3\sqrt{210}i}{196} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{147} & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & -\frac{9\sqrt{42}i}{196} & 0 & 0 & \frac{\sqrt{10}i}{21} & 0 & 0 & 0 & \frac{4\sqrt{14}i}{147} & 0 & 0 & 0 \\
\frac{3\sqrt{210}i}{196} & 0 & 0 & 0 & -\frac{9\sqrt{42}i}{196} & 0 & 0 & \frac{4\sqrt{35}i}{147} & 0 & 0 & 0 & \frac{2\sqrt{105}i}{147} & 0 & 0 \\
0 & \frac{9\sqrt{42}i}{196} & 0 & 0 & 0 & -\frac{3\sqrt{210}i}{196} & 0 & 0 & \frac{2\sqrt{105}i}{147} & 0 & 0 & 0 & \frac{4\sqrt{35}i}{147} & 0 \\
0 & 0 & \frac{9\sqrt{42}i}{196} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{4\sqrt{14}i}{147} & 0 & 0 & 0 & \frac{\sqrt{10}i}{21} \\
0 & 0 & 0 & \frac{3\sqrt{210}i}{196} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{147} & 0 & 0 & 0 \\
0 & -\frac{\sqrt{10}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{14} & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & -\frac{4\sqrt{35}i}{147} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{98} & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & -\frac{2\sqrt{105}i}{147} & 0 & 0 & -\frac{i}{14} & 0 & 0 & 0 & \frac{\sqrt{35}i}{49} & 0 & 0 & 0 \\
-\frac{\sqrt{70}i}{147} & 0 & 0 & 0 & -\frac{4\sqrt{14}i}{147} & 0 & 0 & -\frac{\sqrt{105}i}{98} & 0 & 0 & 0 & \frac{\sqrt{35}i}{49} & 0 & 0 \\
0 & -\frac{4\sqrt{14}i}{147} & 0 & 0 & 0 & -\frac{\sqrt{70}i}{147} & 0 & 0 & -\frac{\sqrt{35}i}{49} & 0 & 0 & 0 & \frac{\sqrt{105}i}{98} & 0 \\
0 & 0 & -\frac{2\sqrt{105}i}{147} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{49} & 0 & 0 & 0 & \frac{i}{14} \\
0 & 0 & 0 & -\frac{4\sqrt{35}i}{147} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{98} & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{14} & 0 & 0
\end{bmatrix}$$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_{2,2}^{(1,1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & \frac{3\sqrt{210}}{196} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{147} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{9\sqrt{42}}{196} & 0 & 0 & \frac{\sqrt{10}}{21} & 0 & 0 & 0 & -\frac{4\sqrt{14}}{147} & 0 & 0 & 0 \\ \frac{3\sqrt{210}}{196} & 0 & 0 & 0 & \frac{9\sqrt{42}}{196} & 0 & 0 & \frac{4\sqrt{35}}{147} & 0 & 0 & 0 & -\frac{2\sqrt{105}}{147} & 0 & 0 \\ 0 & \frac{9\sqrt{42}}{196} & 0 & 0 & 0 & \frac{3\sqrt{210}}{196} & 0 & 0 & \frac{2\sqrt{105}}{147} & 0 & 0 & 0 & -\frac{4\sqrt{35}}{147} & 0 \\ 0 & 0 & \frac{9\sqrt{42}}{196} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{4\sqrt{14}}{147} & 0 & 0 & 0 & -\frac{\sqrt{10}}{21} \\ 0 & 0 & 0 & \frac{3\sqrt{210}}{196} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{147} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{4\sqrt{35}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{98} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{2\sqrt{105}}{147} & 0 & 0 & -\frac{1}{14} & 0 & 0 & 0 & -\frac{\sqrt{35}}{49} & 0 & 0 & 0 \\ -\frac{\sqrt{70}}{147} & 0 & 0 & 0 & \frac{4\sqrt{14}}{147} & 0 & 0 & -\frac{\sqrt{105}}{98} & 0 & 0 & 0 & -\frac{\sqrt{35}}{49} & 0 & 0 \\ 0 & -\frac{4\sqrt{14}}{147} & 0 & 0 & 0 & \frac{\sqrt{70}}{147} & 0 & 0 & -\frac{\sqrt{35}}{49} & 0 & 0 & 0 & -\frac{\sqrt{105}}{98} & 0 \\ 0 & 0 & -\frac{2\sqrt{105}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{49} & 0 & 0 & 0 & -\frac{1}{14} \\ 0 & 0 & 0 & -\frac{4\sqrt{35}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{98} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{14} & 0 & 0 \end{bmatrix}$
890	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_4^{(1,1;a)}(A_1,1)$	$\begin{pmatrix} -\frac{\sqrt{2310}}{294} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{4\sqrt{385}}{539} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2310}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{16\sqrt{231}}{1617} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2310}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{770}}{539} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2310}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{770}}{539} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{16\sqrt{231}}{1617} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{294} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{4\sqrt{385}}{539} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{924} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{4\sqrt{385}}{539} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{13\sqrt{2310}}{6468} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{16\sqrt{231}}{1617} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{2156} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{2\sqrt{770}}{539} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2310}}{2156} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{2\sqrt{770}}{539} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2310}}{2156} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{16\sqrt{231}}{1617} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{2156} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{4\sqrt{385}}{539} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{13\sqrt{2310}}{6468} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{924} \end{pmatrix}$
891	symmetry	$\frac{\sqrt{70}yz\left(3x^2-y^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_4^{(1,1;a)}(A_1,2)$	$\begin{pmatrix} 0 & 0 & 0 & \frac{\sqrt{330}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}i}{77} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{165} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{42} & -\frac{3\sqrt{385}i}{385} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{55}i}{385} & 0 \\ -\frac{\sqrt{330}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{55}i}{385} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{385}i}{385} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}i}{165} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{330}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}i}{77} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{385}i}{385} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}i}{462} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{55}i}{385} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{231} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{165} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}i}{77} & \frac{\sqrt{1155}i}{462} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}i}{231} & 0 \\ \frac{\sqrt{110}i}{77} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}i}{231} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}i}{462} \\ 0 & \frac{\sqrt{330}i}{165} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{55}i}{385} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{231} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{385}i}{385} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}i}{462} & 0 & 0 & 0 \end{pmatrix}$
892	symmetry	$\frac{\sqrt{70}xz\left(x^2-3y^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_4^{(1,1;a)}(A_2)$	$\begin{pmatrix} 0 & 0 & 0 & -\frac{\sqrt{330}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}}{77} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{165} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{42} & -\frac{3\sqrt{385}}{385} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{55}}{385} & 0 \\ -\frac{\sqrt{330}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{55}}{385} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{385}}{385} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{165} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{330}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}}{77} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{385}}{385} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{462} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{55}}{385} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{231} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{165} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}}{77} & \frac{\sqrt{1155}}{462} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{231} & 0 \\ \frac{\sqrt{110}}{77} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{231} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}}{462} \\ 0 & \frac{\sqrt{330}}{165} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{55}}{385} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{231} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{385}}{385} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}}{462} & 0 & 0 & 0 \end{pmatrix}$
893	symmetry	$-\frac{\sqrt{10}xz\left(3x^2+3y^2-4z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_{4,1}^{(1,1;a)}(E,1)$	$\begin{pmatrix} 0 & -\frac{\sqrt{1155}}{147} & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}}{77} & 0 & \frac{10\sqrt{462}}{1617} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{1155}}{147} & 0 & \frac{5\sqrt{462}}{294} & 0 & 0 & 0 & 0 & \frac{13\sqrt{770}}{2695} & 0 & -\frac{2\sqrt{154}}{539} & 0 & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{462}}{294} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}}{8085} & 0 & -\frac{\sqrt{77}}{77} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{5\sqrt{462}}{294} & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}}{77} & 0 & -\frac{\sqrt{1155}}{8085} & 0 & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{462}}{294} & 0 & \frac{\sqrt{1155}}{147} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{154}}{539} & 0 & \frac{13\sqrt{770}}{2695} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{10\sqrt{462}}{1617} & 0 & -\frac{\sqrt{22}}{77} \\ -\frac{\sqrt{22}}{77} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{33}}{462} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{13\sqrt{770}}{2695} & 0 & 0 & 0 & 0 & \frac{5\sqrt{33}}{462} & 0 & -\frac{5\sqrt{77}}{1078} & 0 & 0 & 0 & 0 & 0 \\ \frac{10\sqrt{462}}{1617} & 0 & -\frac{\sqrt{1155}}{8085} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{77}}{1078} & 0 & -\frac{3\sqrt{385}}{1078} & 0 & 0 & 0 & 0 \\ 0 & -\frac{2\sqrt{154}}{539} & 0 & -\frac{\sqrt{77}}{77} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{385}}{1078} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{77}}{77} & 0 & -\frac{2\sqrt{154}}{539} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{385}}{1078} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{1155}}{8085} & 0 & \frac{10\sqrt{462}}{1617} & 0 & 0 & 0 & 0 & \frac{3\sqrt{385}}{1078} & 0 & \frac{5\sqrt{77}}{1078} & 0 \\ 0 & 0 & 0 & 0 & \frac{13\sqrt{770}}{2695} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{77}}{1078} & 0 & -\frac{5\sqrt{33}}{462} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}}{77} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{33}}{462} & 0 \end{pmatrix}$
894	symmetry	$-\frac{\sqrt{10}yz\left(3x^2+3y^2-4z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_{4,2}^{(1,1;a)}(E,1)$	$\begin{pmatrix} 0 & \frac{\sqrt{1155}i}{147} & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}i}{77} & 0 & -\frac{10\sqrt{462}i}{1617} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{1155}i}{147} & 0 & -\frac{5\sqrt{462}i}{294} & 0 & 0 & 0 & 0 & \frac{13\sqrt{770}i}{2695} & 0 & \frac{2\sqrt{154}i}{539} & 0 & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{462}i}{294} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}i}{8085} & 0 & \frac{\sqrt{77}i}{77} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{5\sqrt{462}i}{294} & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}i}{77} & 0 & \frac{\sqrt{1155}i}{8085} & 0 & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{462}i}{294} & 0 & -\frac{\sqrt{1155}i}{147} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{154}i}{539} & 0 & -\frac{13\sqrt{770}i}{2695} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{1155}i}{147} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{10\sqrt{462}i}{1617} & 0 & \frac{\sqrt{22}i}{77} \\ \frac{\sqrt{22}i}{77} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{33}i}{462} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{13\sqrt{770}i}{2695} & 0 & 0 & 0 & 0 & \frac{5\sqrt{33}i}{462} & 0 & \frac{5\sqrt{77}i}{1078} & 0 & 0 & 0 & 0 & 0 \\ \frac{10\sqrt{462}i}{1617} & 0 & \frac{\sqrt{1155}i}{8085} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{77}i}{1078} & 0 & \frac{3\sqrt{385}i}{1078} & 0 & 0 & 0 & 0 \\ 0 & -\frac{2\sqrt{154}i}{539} & 0 & \frac{\sqrt{77}i}{77} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{385}i}{1078} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{77}i}{77} & 0 & \frac{2\sqrt{154}i}{539} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{385}i}{1078} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{1155}i}{8085} & 0 & -\frac{10\sqrt{462}i}{1617} & 0 & 0 & 0 & 0 & \frac{3\sqrt{385}i}{1078} & 0 & -\frac{5\sqrt{77}i}{1078} & 0 \\ 0 & 0 & 0 & 0 & \frac{13\sqrt{770}i}{2695} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{77}i}{1078} & 0 & \frac{5\sqrt{33}i}{462} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}i}{77} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{33}i}{462} & 0 \end{pmatrix}$
895	symmetry	$-\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_{4,1}^{(1,1;a)}(E,2)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{4\sqrt{33}i}{231} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{8\sqrt{55}i}{385} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{770}i}{385} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{770}i}{385} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{330}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{8\sqrt{55}i}{385} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{330}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{4\sqrt{33}i}{231} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{770}i}{385} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}i}{924} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{8\sqrt{55}i}{385} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{22}i}{308} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{4\sqrt{33}i}{231} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{22}i}{308} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}i}{924} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{924} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{4\sqrt{33}i}{231} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{22}i}{308} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{8\sqrt{55}i}{385} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{22}i}{308} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{2\sqrt{770}i}{385} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{924} & 0 & 0 & 0 & 0 \end{pmatrix}$
896	symmetry	$\frac{\sqrt{35}\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_{4,2}^{(1,1;a)}(E,2)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{4\sqrt{33}}{231} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{8\sqrt{55}}{385} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{770}}{385} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{770}}{385} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{330}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{8\sqrt{55}}{385} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{330}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{4\sqrt{33}}{231} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{770}}{385} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{924} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{8\sqrt{55}}{385} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{22}}{308} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{4\sqrt{33}}{231} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{22}}{308} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{924} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{924} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{4\sqrt{33}}{231} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{22}}{308} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{8\sqrt{55}}{385} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{22}}{308} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{2\sqrt{770}}{385} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{924} & 0 & 0 & 0 & 0 \end{pmatrix}$
897	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_{4,1}^{(1,1;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{1155}i}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{4\sqrt{385}i}{539} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{231}i}{294} & 0 & 0 & -\frac{6\sqrt{55}i}{385} & 0 & 0 & 0 & -\frac{2\sqrt{77}i}{539} & 0 & 0 & 0 \\ -\frac{\sqrt{1155}i}{98} & 0 & 0 & 0 & -\frac{5\sqrt{231}i}{294} & 0 & 0 & \frac{9\sqrt{770}i}{2695} & 0 & 0 & 0 & \frac{17\sqrt{2310}i}{8085} & 0 & 0 \\ 0 & \frac{5\sqrt{231}i}{294} & 0 & 0 & 0 & \frac{\sqrt{1155}i}{98} & 0 & 0 & \frac{17\sqrt{2310}i}{8085} & 0 & 0 & 0 & \frac{9\sqrt{770}i}{2695} & 0 \\ 0 & 0 & \frac{5\sqrt{231}i}{294} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{77}i}{539} & 0 & 0 & 0 & -\frac{6\sqrt{55}i}{385} \\ 0 & 0 & 0 & -\frac{\sqrt{1155}i}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{4\sqrt{385}i}{539} & 0 & 0 & 0 \\ 0 & \frac{6\sqrt{55}i}{385} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{22}i}{308} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{9\sqrt{770}i}{2695} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{6468} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{17\sqrt{2310}i}{8085} & 0 & 0 & \frac{5\sqrt{22}i}{308} & 0 & 0 & 0 & \frac{\sqrt{770}i}{539} & 0 & 0 & 0 \\ \frac{4\sqrt{385}i}{539} & 0 & 0 & 0 & \frac{2\sqrt{77}i}{539} & 0 & 0 & \frac{\sqrt{2310}i}{6468} & 0 & 0 & 0 & \frac{\sqrt{770}i}{539} & 0 & 0 \\ 0 & \frac{2\sqrt{77}i}{539} & 0 & 0 & 0 & \frac{4\sqrt{385}i}{539} & 0 & 0 & -\frac{\sqrt{770}i}{539} & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{6468} & 0 \\ 0 & 0 & -\frac{17\sqrt{2310}i}{8085} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}i}{539} & 0 & 0 & 0 & -\frac{5\sqrt{22}i}{308} \\ 0 & 0 & 0 & -\frac{9\sqrt{770}i}{2695} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}i}{6468} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{6\sqrt{55}i}{385} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{22}i}{308} & 0 & 0 \end{bmatrix}$
898	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
899	symmetry	z

$\mathbb{Q}_{4,2}^{(1,1;a)}(E,3)$

$$\begin{pmatrix}
0 & 0 & -\frac{\sqrt{1155}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{4\sqrt{385}}{539} & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & \frac{5\sqrt{231}}{294} & 0 & 0 & -\frac{6\sqrt{55}}{385} & 0 & 0 & 0 & \frac{2\sqrt{77}}{539} & 0 & 0 & 0 \\
-\frac{\sqrt{1155}}{98} & 0 & 0 & 0 & \frac{5\sqrt{231}}{294} & 0 & 0 & \frac{9\sqrt{770}}{2695} & 0 & 0 & 0 & -\frac{17\sqrt{2310}}{8085} & 0 & 0 \\
0 & \frac{5\sqrt{231}}{294} & 0 & 0 & 0 & -\frac{\sqrt{1155}}{98} & 0 & 0 & \frac{17\sqrt{2310}}{8085} & 0 & 0 & 0 & -\frac{9\sqrt{770}}{2695} & 0 \\
0 & 0 & \frac{5\sqrt{231}}{294} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{77}}{539} & 0 & 0 & 0 & \frac{6\sqrt{55}}{385} \\
0 & 0 & 0 & -\frac{\sqrt{1155}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{4\sqrt{385}}{539} & 0 & 0 & 0 \\
0 & -\frac{6\sqrt{55}}{385} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{22}}{308} & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & \frac{9\sqrt{770}}{2695} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{6468} & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & \frac{17\sqrt{2310}}{8085} & 0 & 0 & \frac{5\sqrt{22}}{308} & 0 & 0 & 0 & -\frac{\sqrt{770}}{539} & 0 & 0 & 0 \\
\frac{4\sqrt{385}}{539} & 0 & 0 & 0 & -\frac{2\sqrt{77}}{539} & 0 & 0 & \frac{\sqrt{2310}}{6468} & 0 & 0 & 0 & -\frac{\sqrt{770}}{539} & 0 & 0 \\
0 & \frac{2\sqrt{77}}{539} & 0 & 0 & 0 & -\frac{4\sqrt{385}}{539} & 0 & 0 & -\frac{\sqrt{770}}{539} & 0 & 0 & 0 & \frac{\sqrt{2310}}{6468} & 0 \\
0 & 0 & -\frac{17\sqrt{2310}}{8085} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}}{539} & 0 & 0 & 0 & \frac{5\sqrt{22}}{308} \\
0 & 0 & 0 & -\frac{9\sqrt{770}}{2695} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{6468} & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & \frac{6\sqrt{55}}{385} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{22}}{308} & 0 & 0
\end{pmatrix}$$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_1^{(1,0;a)}(A_2)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
900	symmetry	$-y$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_{1,1}^{(1,0;a)}(E)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{8} & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{35}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{210}}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & \frac{\sqrt{6}}{8} \\ \frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{14}}{56} & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
901	symmetry	x

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_{1,2}^{(1,0;a)}(E)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{8} & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{56} & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & -\frac{\sqrt{210}i}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & -\frac{\sqrt{6}i}{8} \\ -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{14}i}{56} & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}i}{56} & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
902	symmetry	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_3^{(1,0;a)}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{24} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{42}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
903	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_3^{(1,0;a)}(A_2,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
904	symmetry	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_3^{(1,0;a)}(A_2,2)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{24} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
905	symmetry	$\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_{3,1}^{(1,0;a)}(E,1)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{12} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{12} & 0 & -\frac{1}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & \frac{\sqrt{2}}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{24} & 0 & \frac{\sqrt{30}}{24} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{6} & 0 & \frac{\sqrt{5}}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & -\frac{\sqrt{7}}{12} \\ -\frac{\sqrt{7}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{1}{6} & 0 & \frac{\sqrt{2}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}}{24} & 0 & -\frac{1}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
906	symmetry	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_{3,2}^{(1,0;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{12} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{12} & 0 & \frac{i}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & -\frac{\sqrt{2}i}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{24} & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{6} & 0 & -\frac{\sqrt{5}i}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{7}i}{12} \\ \frac{\sqrt{7}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{3}i}{6} & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{6} & 0 & -\frac{\sqrt{2}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{24} & 0 & \frac{i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
907	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_{3,1}^{(1,0;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{12} & 0 & 0 & 0 & -\frac{\sqrt{10}i}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{12} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & \frac{i}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{12} & 0 & 0 & 0 & \frac{\sqrt{14}i}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{6} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{14}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{6} & 0 & 0 & 0 & \frac{\sqrt{10}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{12} & 0 & 0 & 0 & \frac{\sqrt{2}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
908	symmetry	$\sqrt{15}xyz$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_{3,2}^{(1,0;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{12} & 0 & 0 & 0 & \frac{\sqrt{10}}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{12} & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & -\frac{1}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{12} & 0 & 0 & 0 & -\frac{\sqrt{14}}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{6} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{14}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{1}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}}{6} & 0 & 0 & 0 & -\frac{\sqrt{10}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}}{12} & 0 & 0 & 0 & -\frac{\sqrt{2}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
909	symmetry	$-\frac{\sqrt{70}x\left(x^2-3y^2\right)\left(x^2+y^2-8z^2\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_5^{(1,0;a)}(A_1)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{60} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{60} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{210}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{210}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
910	symmetry	$\frac{z\left(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_5^{(1,0;a)}(A_2,1)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
911	symmetry	$-\frac{\sqrt{70}y\left(3x^2-y^2\right)\left(x^2+y^2-8z^2\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_5^{(1,0;a)}(A_2,2)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{60} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{60} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{210}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{210}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
912	symmetry	$\frac{3\sqrt{14}y\left(5x^4-10x^2y^2+y^4\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_{5,1}^{(1,0;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
913	symmetry	$\frac{3\sqrt{14}x\left(x^4-10x^2y^2+5y^4\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_{5,2}^{(1,0;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
914	symmetry	$-\frac{\sqrt{15}y\left(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_{5,1}^{(1,0;a)}(E,2)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{24} & 0 & \frac{5\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{23\sqrt{70}}{840} & 0 & -\frac{13\sqrt{14}}{168} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{11\sqrt{105}}{420} & 0 & \frac{\sqrt{7}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{84} & 0 & \frac{11\sqrt{105}}{420} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{13\sqrt{14}}{168} & 0 & -\frac{23\sqrt{70}}{840} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{168} & 0 & \frac{\sqrt{2}}{24} \\ \frac{\sqrt{2}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{23\sqrt{70}}{840} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{5\sqrt{42}}{168} & 0 & \frac{11\sqrt{105}}{420} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{13\sqrt{14}}{168} & 0 & \frac{\sqrt{7}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{7}}{84} & 0 & -\frac{13\sqrt{14}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{11\sqrt{105}}{420} & 0 & \frac{5\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{23\sqrt{70}}{840} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
915	symmetry	$\frac{\sqrt{15}x\left(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_{5,2}^{(1,0;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{24} & 0 & -\frac{5\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{23\sqrt{70}i}{840} & 0 & \frac{13\sqrt{14}i}{168} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{11\sqrt{105}i}{420} & 0 & -\frac{\sqrt{7}i}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{84} & 0 & -\frac{11\sqrt{105}i}{420} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{13\sqrt{14}i}{168} & 0 & \frac{23\sqrt{70}i}{840} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{168} & 0 & -\frac{\sqrt{2}i}{24} \\ -\frac{\sqrt{2}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{23\sqrt{70}i}{840} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{5\sqrt{42}i}{168} & 0 & -\frac{11\sqrt{105}i}{420} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{13\sqrt{14}i}{168} & 0 & -\frac{\sqrt{7}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{7}i}{84} & 0 & \frac{13\sqrt{14}i}{168} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{11\sqrt{105}i}{420} & 0 & -\frac{5\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{23\sqrt{70}i}{840} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
916	symmetry	$-\frac{3\sqrt{35}z\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_{5,1}^{(1,0;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{30} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{105}i}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{105}i}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
917	symmetry	$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_{5,2}^{(1,0;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{60} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{30} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{105}}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{105}}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
918	symmetry	$\frac{\sqrt{105}z(x-y)(x+y)\left(x^2+y^2-2z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_{5,1}^{(1,0;a)}(E,4)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{60} & 0 & 0 & 0 & -\frac{\sqrt{2}i}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{5}i}{15} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 & 0 & \frac{2\sqrt{5}i}{15} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{6} & 0 & 0 & 0 & -\frac{\sqrt{70}i}{60} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{12} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{70}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{2\sqrt{5}i}{15} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}i}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{10}i}{12} & 0 & 0 & 0 & \frac{\sqrt{2}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{6} & 0 & 0 & 0 & -\frac{\sqrt{10}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}i}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{5}i}{15} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
919	symmetry	$-\frac{\sqrt{105}xyz\left(x^2+y^2-2z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_{5,2}^{(1,0;a)}(E,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{60} & 0 & 0 & 0 & \frac{\sqrt{2}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{5}}{15} & 0 & 0 & 0 & \frac{\sqrt{15}}{30} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 & 0 & -\frac{2\sqrt{5}}{15} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{6} & 0 & 0 & 0 & \frac{\sqrt{70}}{60} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{12} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{70}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{2\sqrt{5}}{15} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{10}}{12} & 0 & 0 & 0 & -\frac{\sqrt{2}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{6} & 0 & 0 & 0 & \frac{\sqrt{10}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{5}}{15} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
920	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_2^{(1,0;a)}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}i}{84} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{5\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
921	symmetry	$\sqrt{3}xz$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}^{(1,0;a)}_{2,1}(E,1)$	$\begin{matrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{2}i}{24} & 0 & \frac{5\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{168} & 0 & \frac{11\sqrt{14}i}{168} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{7}i}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{12} & 0 & \frac{\sqrt{105}i}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{11\sqrt{14}i}{168} & 0 & -\frac{\sqrt{70}i}{168} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{168} & 0 & -\frac{5\sqrt{2}i}{24} \\ \frac{5\sqrt{2}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{70}i}{168} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{5\sqrt{42}i}{168} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{11\sqrt{14}i}{168} & 0 & -\frac{\sqrt{7}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}i}{12} & 0 & -\frac{11\sqrt{14}i}{168} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & -\frac{5\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{168} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{2}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{matrix}$
922	symmetry	$\sqrt{3}yz$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_{2,2}^{(1,0;a)}(E,1)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{2}}{24} & 0 & \frac{5\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{168} & 0 & \frac{11\sqrt{14}}{168} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{7}}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{12} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{11\sqrt{14}}{168} & 0 & -\frac{\sqrt{70}}{168} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{168} & 0 & -\frac{5\sqrt{2}}{24} \\ \frac{5\sqrt{2}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{70}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{5\sqrt{42}}{168} & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{11\sqrt{14}}{168} & 0 & -\frac{\sqrt{7}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{7}}{12} & 0 & -\frac{11\sqrt{14}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{105}}{84} & 0 & -\frac{5\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{2}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
923	symmetry	$\sqrt{3}xy$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}^{(1,0;a)}_{2,1}(E,2)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{12} & 0 & 0 & 0 & \frac{\sqrt{14}}{21} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{21} & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & \frac{\sqrt{35}}{21} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{21} & 0 & 0 & 0 & \frac{\sqrt{10}}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{84} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{35}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{70}}{84} & 0 & 0 & 0 & \frac{\sqrt{14}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{14}}{21} & 0 & 0 & 0 & \frac{\sqrt{70}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{35}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
924	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}^{(1,0;a)}_{2,2}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{12} & 0 & 0 & 0 & \frac{\sqrt{14}i}{21} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{21} & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & 0 & \frac{\sqrt{35}i}{21} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{21} & 0 & 0 & 0 & \frac{\sqrt{10}i}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{84} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{35}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{70}i}{84} & 0 & 0 & 0 & \frac{\sqrt{14}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{14}i}{21} & 0 & 0 & 0 & \frac{\sqrt{70}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
925	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_4^{(1,0;a)}(A_1,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{154}i}{77} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}i}{154} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}i}{154} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{154}i}{77} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}i}{154} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2310}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{2\sqrt{154}i}{77} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{1155}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{1155}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{2\sqrt{154}i}{77} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
926	symmetry	$\frac{\sqrt{70}yz\left(3x^2-y^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_4^{(1,0;a)}(A_1,2)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{44} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{7\sqrt{55}}{220} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2310}}{440} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{440} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{440} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2310}}{440} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{7\sqrt{55}}{220} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{44} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{2310}}{440} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{330}}{440} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{7\sqrt{55}}{220} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{165}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{7\sqrt{55}}{220} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{330}}{440} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{2310}}{440} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
927	symmetry	$\frac{\sqrt{70}xz\left(x^2-3y^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_4^{(1,0;a)}(A_2)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{44} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{7\sqrt{55}i}{220} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2310}i}{440} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}i}{440} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}i}{440} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2310}i}{440} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{7\sqrt{55}i}{220} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{44} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{2310}i}{440} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{330}i}{440} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{7\sqrt{55}i}{220} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{165}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{7\sqrt{55}i}{220} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{330}i}{440} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{2310}i}{440} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
928	symmetry	$-\frac{\sqrt{10}xz\left(3x^2+3y^2-4z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_{4,1}^{(1,0;a)}(E,1)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{33}i}{44} & 0 & -\frac{5\sqrt{77}i}{154} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{13\sqrt{1155}i}{1540} & 0 & \frac{\sqrt{231}i}{154} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{770}i}{3080} & 0 & \frac{\sqrt{462}i}{88} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{462}i}{88} & 0 & \frac{\sqrt{770}i}{3080} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{231}i}{154} & 0 & -\frac{13\sqrt{1155}i}{1540} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{77}i}{154} & 0 & \frac{\sqrt{33}i}{44} \\ -\frac{\sqrt{33}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{13\sqrt{1155}i}{1540} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{5\sqrt{77}i}{154} & 0 & -\frac{\sqrt{770}i}{3080} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{231}i}{154} & 0 & -\frac{\sqrt{462}i}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{462}i}{88} & 0 & -\frac{\sqrt{231}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{770}i}{3080} & 0 & \frac{5\sqrt{77}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{13\sqrt{1155}i}{1540} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
929	symmetry	$-\frac{\sqrt{10}yz\left(3x^2+3y^2-4z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}^{(1,0;a)}_{4,2}(E,1)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}}{44} & 0 & -\frac{5\sqrt{77}}{154} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{13\sqrt{1155}}{1540} & 0 & \frac{\sqrt{231}}{154} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}}{3080} & 0 & \frac{\sqrt{462}}{88} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{462}}{88} & 0 & \frac{\sqrt{770}}{3080} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}}{154} & 0 & -\frac{13\sqrt{1155}}{1540} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{77}}{154} & 0 & \frac{\sqrt{33}}{44} \\ -\frac{\sqrt{33}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{13\sqrt{1155}}{1540} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{5\sqrt{77}}{154} & 0 & -\frac{\sqrt{770}}{3080} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{231}}{154} & 0 & -\frac{\sqrt{462}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{462}}{88} & 0 & -\frac{\sqrt{231}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{770}}{3080} & 0 & \frac{5\sqrt{77}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{13\sqrt{1155}}{1540} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{33}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
930	symmetry	$-\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_{4,1}^{(1,0;a)}(E,2)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{22} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{55} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{110} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{110} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{55} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{22} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{1155}}{110} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{55} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{22} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{22}}{22} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{330}}{55} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{1155}}{110} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
931	symmetry	$\frac{\sqrt{35}\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_{4,2}^{(1,0;a)}(E,2)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}i}{22} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{55} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}i}{110} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}i}{110} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}i}{55} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}i}{22} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{1155}i}{110} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{55} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}i}{22} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{22}i}{22} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{330}i}{55} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{1155}i}{110} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
932	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_{4,1}^{(1,0;a)}(E,3)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{154} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{330}}{220} & 0 & 0 & 0 & -\frac{\sqrt{462}}{308} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{1155}}{1540} & 0 & 0 & 0 & \frac{17\sqrt{385}}{1540} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{17\sqrt{385}}{1540} & 0 & 0 & 0 & \frac{9\sqrt{1155}}{1540} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{462}}{308} & 0 & 0 & 0 & -\frac{3\sqrt{330}}{220} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{154} & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{330}}{220} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{9\sqrt{1155}}{1540} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{17\sqrt{385}}{1540} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2310}}{154} & 0 & 0 & 0 & -\frac{\sqrt{462}}{308} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{462}}{308} & 0 & 0 & 0 & -\frac{\sqrt{2310}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{17\sqrt{385}}{1540} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{9\sqrt{1155}}{1540} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{330}}{220} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
933	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_{4,2}^{(1,0;a)}(E,3)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{154} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{330}i}{220} & 0 & 0 & 0 & -\frac{\sqrt{462}i}{308} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{1155}i}{1540} & 0 & 0 & 0 & \frac{17\sqrt{385}i}{1540} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{17\sqrt{385}i}{1540} & 0 & 0 & 0 & \frac{9\sqrt{1155}i}{1540} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{462}i}{308} & 0 & 0 & 0 & -\frac{3\sqrt{330}i}{220} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}i}{154} & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{330}i}{220} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{9\sqrt{1155}i}{1540} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{17\sqrt{385}i}{1540} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2310}i}{154} & 0 & 0 & 0 & -\frac{\sqrt{462}i}{308} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{462}i}{308} & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{17\sqrt{385}i}{1540} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{9\sqrt{1155}i}{1540} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{330}i}{220} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
934	symmetry	$-\frac{5x^6}{16}-\frac{15x^4y^2}{16}+\frac{45x^4z^2}{8}-\frac{15x^2y^4}{16}+\frac{45x^2y^2z^2}{4}-\frac{15x^2z^4}{2}-\frac{5y^6}{16}+\frac{45y^4z^2}{8}-\frac{15y^2z^4}{2}+z^6$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_6^{(1,0;a)}(A_1,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{66}i}{132} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}i}{44} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{33}i}{66} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{33}i}{66} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}i}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}i}{132} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{66}i}{132} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{110}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{33}i}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{33}i}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{110}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{66}i}{132} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
935	symmetry	$\frac{\sqrt{462}(x-y)(x+y)\left(x^2-4xy+y^2\right)\left(x^2+4xy+y^2\right)}{32}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_6^{(1,0;a)}(A_1,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
936	symmetry	$-\frac{\sqrt{210}yz\left(3x^2-y^2\right)\left(3x^2+3y^2-8z^2\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_6^{(1,0;a)}(A_1,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}}{44} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{44} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}}{44} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}}{44} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}}{44} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{231}}{44} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}}{44} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{22}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{154}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{231}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{77}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{231}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{154}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{22}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
937	symmetry	$\frac{\sqrt{462}xy\left(x^2-3y^2\right)\left(3x^2-y^2\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_6^{(1,0;a)}(A_2,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
938	symmetry	$-\frac{\sqrt{210}xz\left(x^2-3y^2\right)\left(3x^2+3y^2-8z^2\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_6^{(1,0;a)}(A_2,2)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}i}{44} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}i}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}i}{44} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}i}{44} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}i}{44} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}i}{44} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}i}{44} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}i}{44} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{22}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{154}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{231}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{77}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{231}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{154}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{22}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
939	symmetry	$-\frac{3\sqrt{154}xz\left(x^4-10x^2y^2+5y^4\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_{6,1}^{(1,0;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{21}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
940	symmetry	$\frac{3\sqrt{154}yz\left(5x^4-10x^2y^2+y^4\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_{6,2}^{(1,0;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{21}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
941	symmetry	$\frac{\sqrt{21}xz\left(5x^4+10x^2y^2-20x^2z^2+5y^4-20y^2z^2+8z^4\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_{6,1}^{(1,0;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}i}{264} & 0 & \frac{\sqrt{462}i}{264} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{770}i}{264} & 0 & -\frac{5\sqrt{154}i}{264} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}i}{132} & 0 & \frac{5\sqrt{77}i}{132} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{77}i}{132} & 0 & -\frac{\sqrt{1155}i}{132} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{154}i}{264} & 0 & \frac{\sqrt{770}i}{264} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{462}i}{264} & 0 & -\frac{\sqrt{22}i}{264} \\ \frac{\sqrt{22}i}{264} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{770}i}{264} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{462}i}{264} & 0 & \frac{\sqrt{1155}i}{132} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{154}i}{264} & 0 & -\frac{5\sqrt{77}i}{132} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{77}i}{132} & 0 & \frac{5\sqrt{154}i}{264} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{1155}i}{132} & 0 & -\frac{\sqrt{462}i}{264} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{770}i}{264} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}i}{264} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
942	symmetry	$\frac{\sqrt{21}yz\left(5x^4+10x^2y^2-20x^2z^2+5y^4-20y^2z^2+8z^4\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}^{(1,0;a)}_{6,2}(E,2)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{264} & 0 & \frac{\sqrt{462}}{264} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}}{264} & 0 & -\frac{5\sqrt{154}}{264} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{132} & 0 & \frac{5\sqrt{77}}{132} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{77}}{132} & 0 & -\frac{\sqrt{1155}}{132} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{154}}{264} & 0 & \frac{\sqrt{770}}{264} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{462}}{264} & 0 & -\frac{\sqrt{22}}{264} \\ \frac{\sqrt{22}}{264} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{770}}{264} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{462}}{264} & 0 & \frac{\sqrt{1155}}{132} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{154}}{264} & 0 & -\frac{5\sqrt{77}}{132} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{5\sqrt{77}}{132} & 0 & \frac{5\sqrt{154}}{264} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{1155}}{132} & 0 & -\frac{\sqrt{462}}{264} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{770}}{264} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}}{264} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
943	symmetry	$\frac{3\sqrt{7}xy(x-y)(x+y)\left(x^2+y^2-10z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_{6,1}^{(1,0;a)}(E,3)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{132} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{66} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{132} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}}{44} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{165}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{132} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{154}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2310}}{132} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{165}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
944	symmetry	$-\frac{3\sqrt{7}\left(x^2+y^2-10z^2\right)\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_{6,2}^{(1,0;a)}(E,3)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}i}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{132} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}i}{66} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}i}{132} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}i}{44} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{165}i}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{132} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{154}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2310}i}{132} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{165}i}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
945	symmetry	$\frac{\sqrt{210}xy\left(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}^{(1,0;a)}_{6,1}(E,4)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}}{66} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{11}}{66} & 0 & 0 & 0 & -\frac{\sqrt{385}}{66} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}}{66} & 0 & 0 & 0 & \frac{\sqrt{462}}{66} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{462}}{66} & 0 & 0 & 0 & -\frac{\sqrt{154}}{66} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}}{66} & 0 & 0 & 0 & \frac{\sqrt{11}}{66} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}}{66} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{11}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{154}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{462}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{77}}{66} & 0 & 0 & 0 & -\frac{\sqrt{385}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{385}}{66} & 0 & 0 & 0 & \frac{\sqrt{77}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{462}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{154}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{11}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
946	symmetry	$\frac{\sqrt{210}(x-y)(x+y)\left(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4\right)}{32}$

continued ...

Table 10

No.	multipole	matrix
947	$\mathbb{T}^{(1,0;a)}_{6,2}(E,4)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}i}{66} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}i}{66} & 0 & 0 & 0 & -\frac{\sqrt{385}i}{66} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}i}{66} & 0 & 0 & 0 & \frac{\sqrt{462}i}{66} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{462}i}{66} & 0 & 0 & 0 & -\frac{\sqrt{154}i}{66} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{385}i}{66} & 0 & 0 & 0 & \frac{\sqrt{11}i}{66} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}i}{66} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{11}i}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{154}i}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{462}i}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{77}i}{66} & 0 & 0 & 0 & -\frac{\sqrt{385}i}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{385}i}{66} & 0 & 0 & 0 & \frac{\sqrt{77}i}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{462}i}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{154}i}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{11}i}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
	symmetry	z

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_1^{(a)}(A_2)$	$\begin{pmatrix} \frac{5\sqrt{14}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{98} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{14}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{98} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{14}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{98} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{14}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{98} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{98} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{98} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{21}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{15\sqrt{14}}{196} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{35}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{14}}{196} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}}{196} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{196} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{14}}{196} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{15\sqrt{14}}{196} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{28} \end{pmatrix}$
948	symmetry	$-y$

continued ...

Table 10

No.	multipole	matrix
949	symmetry	$\mathbb{M}^{(a)}_{1,1}(E)$ $\begin{bmatrix} 0 & \frac{\sqrt{70}i}{49} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{28} & 0 & \frac{\sqrt{7}i}{196} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{70}i}{49} & 0 & \frac{4\sqrt{7}i}{49} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{196} & 0 & \frac{\sqrt{21}i}{196} & 0 & 0 & 0 & 0 \\ 0 & -\frac{4\sqrt{7}i}{49} & 0 & \frac{3\sqrt{14}i}{49} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{196} & 0 & \frac{\sqrt{42}i}{196} & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{14}i}{49} & 0 & \frac{4\sqrt{7}i}{49} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{196} & 0 & \frac{\sqrt{70}i}{196} & 0 & 0 \\ 0 & 0 & 0 & -\frac{4\sqrt{7}i}{49} & 0 & \frac{\sqrt{70}i}{49} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{196} & 0 & \frac{\sqrt{105}i}{196} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{49} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{196} & 0 & \frac{\sqrt{3}i}{28} \\ -\frac{\sqrt{3}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}i}{196} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{28} & 0 & \frac{3\sqrt{42}i}{98} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{7}i}{196} & 0 & -\frac{\sqrt{70}i}{196} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{42}i}{98} & 0 & \frac{3\sqrt{210}i}{196} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}i}{196} & 0 & -\frac{\sqrt{42}i}{196} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{210}i}{196} & 0 & \frac{3\sqrt{14}i}{49} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}i}{196} & 0 & -\frac{\sqrt{21}i}{196} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{49} & 0 & \frac{3\sqrt{210}i}{196} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{70}i}{196} & 0 & -\frac{\sqrt{7}i}{196} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{210}i}{196} & 0 & \frac{3\sqrt{42}i}{98} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{196} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{42}i}{98} & 0 & \frac{3\sqrt{2}i}{28} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{28} & 0 \end{bmatrix}$ x

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}^{(a)}_{1,2}(E)$	$\begin{pmatrix} 0 & \frac{\sqrt{70}}{49} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{28} & 0 & \frac{\sqrt{7}}{196} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{70}}{49} & 0 & \frac{4\sqrt{7}}{49} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{196} & 0 & \frac{\sqrt{21}}{196} & 0 & 0 & 0 & 0 \\ 0 & \frac{4\sqrt{7}}{49} & 0 & \frac{3\sqrt{14}}{49} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{196} & 0 & \frac{\sqrt{42}}{196} & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{14}}{49} & 0 & \frac{4\sqrt{7}}{49} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{196} & 0 & \frac{\sqrt{70}}{196} & 0 & 0 \\ 0 & 0 & 0 & \frac{4\sqrt{7}}{49} & 0 & \frac{\sqrt{70}}{49} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{196} & 0 & \frac{\sqrt{105}}{196} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{196} & 0 & \frac{\sqrt{3}}{28} \\ -\frac{\sqrt{3}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}}{196} & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{28} & 0 & \frac{3\sqrt{42}}{98} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{7}}{196} & 0 & -\frac{\sqrt{70}}{196} & 0 & 0 & 0 & 0 & \frac{3\sqrt{42}}{98} & 0 & \frac{3\sqrt{210}}{196} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}}{196} & 0 & -\frac{\sqrt{42}}{196} & 0 & 0 & 0 & 0 & \frac{3\sqrt{210}}{196} & 0 & \frac{3\sqrt{14}}{49} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}}{196} & 0 & -\frac{\sqrt{21}}{196} & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}}{49} & 0 & \frac{3\sqrt{210}}{196} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{70}}{196} & 0 & -\frac{\sqrt{7}}{196} & 0 & 0 & 0 & 0 & \frac{3\sqrt{210}}{196} & 0 & \frac{3\sqrt{42}}{98} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{196} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{42}}{98} & 0 & \frac{3\sqrt{2}}{28} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{28} & 0 \end{pmatrix}$
950	symmetry	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_3^{(a)}(A_1)$	$\begin{pmatrix} 0 & 0 & 0 & -\frac{5\sqrt{3}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{3}}{42} & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{28} & 0 \\ -\frac{5\sqrt{3}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} \\ 0 & -\frac{\sqrt{30}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{3}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{6}}{21} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{14} & -\frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{6}}{21} & 0 \\ -\frac{1}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{6}}{21} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} \\ 0 & -\frac{\sqrt{3}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{21} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{6}}{21} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & 0 \end{pmatrix}$
951	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_3^{(a)}(A_2,1)$	$\begin{bmatrix} -\frac{5\sqrt{3}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{7} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{2\sqrt{3}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{7} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{3}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{7} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{3}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{7} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{3}}{42} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{1}{7} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{7} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{3}}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} \end{bmatrix}$
952	symmetry	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_3^{(a)}(A_2,2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{5\sqrt{3}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{3}i}{42} & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{28} & 0 \\ -\frac{5\sqrt{3}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} \\ 0 & -\frac{\sqrt{30}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{3}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{6}i}{21} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{i}{14} & -\frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{6}i}{21} & 0 \\ -\frac{i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{6}i}{21} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{42} \\ 0 & -\frac{\sqrt{3}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{21} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{6}i}{21} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{42} & 0 & 0 & 0 \end{bmatrix}$
953	symmetry	$\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{3,1}^{(a)}(E,1)$	$\begin{pmatrix} 0 & -\frac{\sqrt{10}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & -\frac{i}{7} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{10}i}{14} & 0 & \frac{i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{42} & 0 & -\frac{\sqrt{3}i}{21} & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{14} & 0 & \frac{\sqrt{2}i}{7} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{28} & 0 & \frac{\sqrt{6}i}{84} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{7} & 0 & \frac{i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{84} & 0 & \frac{\sqrt{10}i}{28} & 0 & 0 \\ 0 & 0 & 0 & -\frac{i}{14} & 0 & -\frac{\sqrt{10}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{21} & 0 & \frac{\sqrt{15}i}{42} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{7} & 0 & -\frac{\sqrt{21}i}{42} \\ \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 & -\frac{\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & 0 \\ \frac{i}{7} & 0 & -\frac{\sqrt{10}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{42} & 0 & \frac{\sqrt{30}i}{42} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{21} & 0 & -\frac{\sqrt{6}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{42} & 0 & \frac{\sqrt{2}i}{7} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{84} & 0 & \frac{\sqrt{3}i}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{7} & 0 & \frac{\sqrt{30}i}{42} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}i}{28} & 0 & \frac{i}{7} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{42} & 0 & -\frac{\sqrt{6}i}{42} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{42} & 0 & -\frac{\sqrt{14}i}{14} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 \end{pmatrix}$
954	symmetry	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}^{(a)}_{3,2}(E,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{10}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & -\frac{1}{7} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{10}}{14} & 0 & \frac{1}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{42} & 0 & -\frac{\sqrt{3}}{21} & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{14} & 0 & \frac{\sqrt{2}}{7} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{28} & 0 & \frac{\sqrt{6}}{84} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}}{7} & 0 & \frac{1}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{84} & 0 & \frac{\sqrt{10}}{28} & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{14} & 0 & -\frac{\sqrt{10}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{21} & 0 & \frac{\sqrt{15}}{42} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{7} & 0 & -\frac{\sqrt{21}}{42} \\ \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & -\frac{\sqrt{6}}{42} & 0 & 0 & 0 & 0 & 0 \\ -\frac{1}{7} & 0 & -\frac{\sqrt{10}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{42} & 0 & \frac{\sqrt{30}}{42} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{21} & 0 & -\frac{\sqrt{6}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{42} & 0 & \frac{\sqrt{2}}{7} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{84} & 0 & \frac{\sqrt{3}}{21} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{7} & 0 & \frac{\sqrt{30}}{42} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{28} & 0 & \frac{1}{7} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{42} & 0 & -\frac{\sqrt{6}}{42} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{42} & 0 & -\frac{\sqrt{14}}{14} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 \end{bmatrix}$
955	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{3,1}^{(a)}(E,2)$	$\begin{bmatrix} 0 & 0 & \frac{5\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{21} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{28} & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & 0 & \frac{\sqrt{30}}{42} & 0 & 0 & 0 \\ \frac{5\sqrt{2}}{28} & 0 & 0 & 0 & -\frac{\sqrt{10}}{28} & 0 & 0 & -\frac{\sqrt{3}}{42} & 0 & 0 & 0 & \frac{1}{14} & 0 & 0 \\ 0 & \frac{\sqrt{10}}{28} & 0 & 0 & 0 & -\frac{5\sqrt{2}}{28} & 0 & 0 & \frac{1}{14} & 0 & 0 & 0 & -\frac{\sqrt{3}}{42} & 0 \\ 0 & 0 & -\frac{\sqrt{10}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{42} & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} \\ 0 & 0 & 0 & -\frac{5\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{21} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{14} & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & \frac{\sqrt{3}}{21} & 0 & 0 & 0 \\ \frac{\sqrt{6}}{21} & 0 & 0 & 0 & \frac{\sqrt{30}}{42} & 0 & 0 & \frac{3}{14} & 0 & 0 & 0 & -\frac{\sqrt{3}}{21} & 0 & 0 \\ 0 & \frac{\sqrt{30}}{42} & 0 & 0 & 0 & \frac{\sqrt{6}}{21} & 0 & 0 & \frac{\sqrt{3}}{21} & 0 & 0 & 0 & -\frac{3}{14} & 0 \\ 0 & 0 & \frac{1}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{21} & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 \end{bmatrix}$
956	symmetry	$\sqrt{15}xyz$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{3,2}^{(a)}(E,2)$	$\begin{pmatrix} 0 & 0 & \frac{5\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{21} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{28} & 0 & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & 0 & \frac{\sqrt{30}i}{42} & 0 & 0 & 0 \\ -\frac{5\sqrt{2}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{10}i}{28} & 0 & 0 & \frac{\sqrt{3}i}{42} & 0 & 0 & 0 & \frac{i}{14} & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{28} & 0 & 0 & 0 & -\frac{5\sqrt{2}i}{28} & 0 & 0 & -\frac{i}{14} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{42} & 0 \\ 0 & 0 & \frac{\sqrt{10}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{42} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{42} \\ 0 & 0 & 0 & \frac{5\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{21} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{14} & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & 0 & \frac{\sqrt{3}i}{21} & 0 & 0 & 0 \\ -\frac{\sqrt{6}i}{21} & 0 & 0 & 0 & \frac{\sqrt{30}i}{42} & 0 & 0 & -\frac{3i}{14} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{21} & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{42} & 0 & 0 & 0 & \frac{\sqrt{6}i}{21} & 0 & 0 & -\frac{\sqrt{3}i}{21} & 0 & 0 & 0 & -\frac{3i}{14} & 0 \\ 0 & 0 & -\frac{i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{21} & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3i}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 \end{pmatrix}$
957	symmetry	$-\frac{\sqrt{70}x\left(x^2-3y^2\right)\left(x^2+y^2-8z^2\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(a)}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{6}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{2}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{21} & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{3}{14} & 0 \\ \frac{\sqrt{6}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} \\ 0 & -\frac{\sqrt{15}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{2}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{21} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{42} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{2}}{28} & \frac{\sqrt{21}}{21} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{42} & 0 \\ \frac{5\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{42} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{21} \\ 0 & -\frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{21} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{42} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{21} & 0 & 0 & 0 \end{bmatrix}$
958	symmetry	$\frac{z\left(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(a)}(A_2,1)$	$\begin{pmatrix} \frac{\sqrt{42}}{294} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}}{98} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{42}}{294} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{105}}{98} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{5\sqrt{42}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}}{98} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{42}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}}{98} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{294} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{105}}{98} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{294} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}}{98} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{5\sqrt{7}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{23\sqrt{42}}{588} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{105}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{17\sqrt{42}}{588} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{5\sqrt{14}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{196} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{14}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{196} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{105}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{17\sqrt{42}}{588} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{23\sqrt{42}}{588} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} \end{pmatrix}$
959	symmetry	$-\frac{\sqrt{70}y\left(3x^2-y^2\right)\left(x^2+y^2-8z^2\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(a)}(A_2,2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{6}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{2}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{21} & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & \frac{3i}{14} & 0 \\ \frac{\sqrt{6}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3i}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} \\ 0 & -\frac{\sqrt{15}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{2}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{21} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{42} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{2}i}{28} & \frac{\sqrt{21}i}{21} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{42} & 0 \\ \frac{5\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{21} \\ 0 & -\frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{21} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{42} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{21} & 0 & 0 & 0 \end{bmatrix}$
960	symmetry	$\frac{3\sqrt{14}y\left(5x^4-10x^2y^2+y^4\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}^{(a)}_{5,1}(E,1)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{7} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{2}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{3}i}{7} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{7} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{5\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{7} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
961	symmetry	$\frac{3\sqrt{14}x\left(x^4-10x^2y^2+5y^4\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}^{(a)}_{5,2}(E,1)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{2}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{3}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{7} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{5\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{7} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
962	symmetry	$-\frac{\sqrt{15}y\left(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}^{(a)}_{5,1}(E,2)$	$\begin{pmatrix} 0 & \frac{\sqrt{14}i}{98} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{84} & 0 & \frac{5\sqrt{35}i}{196} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{14}i}{98} & 0 & -\frac{\sqrt{35}i}{49} & 0 & 0 & 0 & 0 & -\frac{23\sqrt{21}i}{588} & 0 & -\frac{13\sqrt{105}i}{588} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{35}i}{49} & 0 & \frac{\sqrt{70}i}{49} & 0 & 0 & 0 & 0 & \frac{11\sqrt{14}i}{196} & 0 & \frac{\sqrt{210}i}{588} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{70}i}{49} & 0 & -\frac{\sqrt{35}i}{49} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{588} & 0 & \frac{11\sqrt{14}i}{196} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{35}i}{49} & 0 & \frac{\sqrt{14}i}{98} & 0 & 0 & 0 & 0 & -\frac{13\sqrt{105}i}{588} & 0 & -\frac{23\sqrt{21}i}{588} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{35}i}{196} & 0 & \frac{\sqrt{15}i}{84} \\ -\frac{\sqrt{15}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{23\sqrt{21}i}{588} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{28} & 0 & -\frac{2\sqrt{210}i}{147} & 0 & 0 & 0 & 0 & 0 \\ -\frac{5\sqrt{35}i}{196} & 0 & -\frac{11\sqrt{14}i}{196} & 0 & 0 & 0 & 0 & \frac{2\sqrt{210}i}{147} & 0 & \frac{\sqrt{42}i}{588} & 0 & 0 & 0 & 0 \\ 0 & \frac{13\sqrt{105}i}{588} & 0 & -\frac{\sqrt{210}i}{588} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{588} & 0 & \frac{\sqrt{70}i}{49} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{210}i}{588} & 0 & \frac{13\sqrt{105}i}{588} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{49} & 0 & \frac{\sqrt{42}i}{588} & 0 & 0 \\ 0 & 0 & 0 & -\frac{11\sqrt{14}i}{196} & 0 & -\frac{5\sqrt{35}i}{196} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{588} & 0 & -\frac{2\sqrt{210}i}{147} & 0 \\ 0 & 0 & 0 & 0 & \frac{23\sqrt{21}i}{588} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{210}i}{147} & 0 & \frac{\sqrt{10}i}{28} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{28} & 0 \end{pmatrix}$
963	symmetry	$\frac{\sqrt{15}x\left(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{5,2}^{(a)}(E,2)$	$\begin{bmatrix} 0 & \frac{\sqrt{14}}{98} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{84} & 0 & \frac{5\sqrt{35}}{196} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{14}}{98} & 0 & -\frac{\sqrt{35}}{49} & 0 & 0 & 0 & 0 & \frac{23\sqrt{21}}{588} & 0 & -\frac{13\sqrt{105}}{588} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{35}}{49} & 0 & \frac{\sqrt{70}}{49} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{14}}{196} & 0 & \frac{\sqrt{210}}{588} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{70}}{49} & 0 & -\frac{\sqrt{35}}{49} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{588} & 0 & \frac{11\sqrt{14}}{196} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}}{49} & 0 & \frac{\sqrt{14}}{98} & 0 & 0 & 0 & 0 & \frac{13\sqrt{105}}{588} & 0 & -\frac{23\sqrt{21}}{588} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{35}}{196} & 0 & \frac{\sqrt{15}}{84} \\ -\frac{\sqrt{15}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{23\sqrt{21}}{588} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{28} & 0 & -\frac{2\sqrt{210}}{147} & 0 & 0 & 0 & 0 & 0 \\ \frac{5\sqrt{35}}{196} & 0 & -\frac{11\sqrt{14}}{196} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{210}}{147} & 0 & \frac{\sqrt{42}}{588} & 0 & 0 & 0 & 0 \\ 0 & -\frac{13\sqrt{105}}{588} & 0 & -\frac{\sqrt{210}}{588} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{588} & 0 & \frac{\sqrt{70}}{49} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{210}}{588} & 0 & \frac{13\sqrt{105}}{588} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{49} & 0 & \frac{\sqrt{42}}{588} & 0 & 0 \\ 0 & 0 & 0 & \frac{11\sqrt{14}}{196} & 0 & -\frac{5\sqrt{35}}{196} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{588} & 0 & -\frac{2\sqrt{210}}{147} & 0 \\ 0 & 0 & 0 & 0 & -\frac{23\sqrt{21}}{588} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{210}}{147} & 0 & \frac{\sqrt{10}}{28} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{28} & 0 \end{bmatrix}$
964	symmetry	$-\frac{3\sqrt{35}z\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}^{(a)}_{5,1}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{1}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{1}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 \end{bmatrix}$
965	symmetry	$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{5,2}^{(a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 \end{bmatrix}$
966	symmetry	$\frac{\sqrt{105}z(x-y)(x+y)\left(x^2+y^2-2z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{5,1}^{(a)}(E,4)$	$\begin{bmatrix} 0 & 0 & -\frac{1}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{3}}{42} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{14} & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & \frac{\sqrt{15}}{21} & 0 & 0 & 0 \\ -\frac{1}{14} & 0 & 0 & 0 & -\frac{\sqrt{5}}{14} & 0 & 0 & -\frac{2\sqrt{6}}{21} & 0 & 0 & 0 & \frac{\sqrt{2}}{14} & 0 & 0 \\ 0 & \frac{\sqrt{5}}{14} & 0 & 0 & 0 & \frac{1}{14} & 0 & 0 & \frac{\sqrt{2}}{14} & 0 & 0 & 0 & -\frac{2\sqrt{6}}{21} & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{21} & 0 & 0 & 0 & \frac{\sqrt{21}}{42} \\ 0 & 0 & 0 & \frac{1}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{3}}{42} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{2\sqrt{6}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{14} & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & \frac{\sqrt{6}}{21} & 0 & 0 & 0 \\ -\frac{5\sqrt{3}}{42} & 0 & 0 & 0 & \frac{\sqrt{15}}{21} & 0 & 0 & \frac{3\sqrt{2}}{28} & 0 & 0 & 0 & -\frac{\sqrt{6}}{21} & 0 & 0 \\ 0 & \frac{\sqrt{15}}{21} & 0 & 0 & 0 & -\frac{5\sqrt{3}}{42} & 0 & 0 & \frac{\sqrt{6}}{21} & 0 & 0 & 0 & -\frac{3\sqrt{2}}{28} & 0 \\ 0 & 0 & \frac{\sqrt{2}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{21} & 0 & 0 & 0 & \frac{\sqrt{210}}{84} \\ 0 & 0 & 0 & -\frac{2\sqrt{6}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 \end{bmatrix}$
967	symmetry	$-\frac{\sqrt{105}xyz\left(x^2+y^2-2z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
968	$\mathbb{M}^{(a)}_{5,2}(E,4)$	$\begin{bmatrix} 0 & 0 & -\frac{i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{3}i}{42} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{14} & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & \frac{\sqrt{15}i}{21} & 0 & 0 & 0 \\ \frac{i}{14} & 0 & 0 & 0 & -\frac{\sqrt{5}i}{14} & 0 & 0 & \frac{2\sqrt{6}i}{21} & 0 & 0 & 0 & \frac{\sqrt{2}i}{14} & 0 & 0 \\ 0 & -\frac{\sqrt{5}i}{14} & 0 & 0 & 0 & \frac{i}{14} & 0 & 0 & -\frac{\sqrt{2}i}{14} & 0 & 0 & 0 & -\frac{2\sqrt{6}i}{21} & 0 \\ 0 & 0 & \frac{\sqrt{5}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{21} & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} \\ 0 & 0 & 0 & -\frac{i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{3}i}{42} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{2\sqrt{6}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{14} & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & \frac{\sqrt{6}i}{21} & 0 & 0 & 0 \\ \frac{5\sqrt{3}i}{42} & 0 & 0 & 0 & \frac{\sqrt{15}i}{21} & 0 & 0 & -\frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{21} & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{21} & 0 & 0 & 0 & -\frac{5\sqrt{3}i}{42} & 0 & 0 & -\frac{\sqrt{6}i}{21} & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{28} & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{21} & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} \\ 0 & 0 & 0 & \frac{2\sqrt{6}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 \end{bmatrix}$
	symmetry	z

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_1^{(1,-1;a)}(A_2)$	$\begin{pmatrix} -\frac{5\sqrt{14}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{21}}{49} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{14}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{35}}{49} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{14}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{42}}{49} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{14}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{42}}{49} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{14}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{35}}{49} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{21}}{49} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{2\sqrt{21}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}}{98} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{2\sqrt{35}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}}{98} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{2\sqrt{42}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{98} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{42}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{98} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{2\sqrt{35}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{98} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{21}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}}{98} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} \end{pmatrix}$
969	symmetry	$-y$

continued ...

Table 10

No.	multipole	matrix
970	$\mathbb{M}^{(1,-1;a)}_{1,1}(E)$	$\begin{pmatrix} 0 & -\frac{\sqrt{70}i}{98} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{7} & 0 & -\frac{\sqrt{7}i}{49} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{70}i}{98} & 0 & -\frac{2\sqrt{7}i}{49} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{49} & 0 & -\frac{\sqrt{21}i}{49} & 0 & 0 & 0 & 0 \\ 0 & \frac{2\sqrt{7}i}{49} & 0 & -\frac{3\sqrt{14}i}{98} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{49} & 0 & -\frac{\sqrt{42}i}{49} & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{14}i}{98} & 0 & -\frac{2\sqrt{7}i}{49} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{49} & 0 & -\frac{\sqrt{70}i}{49} & 0 & 0 \\ 0 & 0 & 0 & \frac{2\sqrt{7}i}{49} & 0 & -\frac{\sqrt{70}i}{98} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{49} & 0 & -\frac{\sqrt{105}i}{49} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{49} & 0 & -\frac{\sqrt{3}i}{7} \\ \frac{\sqrt{3}i}{7} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{105}i}{49} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{14} & 0 & \frac{\sqrt{42}i}{49} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{7}i}{49} & 0 & \frac{\sqrt{70}i}{49} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{49} & 0 & \frac{\sqrt{210}i}{98} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}i}{49} & 0 & \frac{\sqrt{42}i}{49} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{98} & 0 & \frac{2\sqrt{14}i}{49} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}i}{49} & 0 & \frac{\sqrt{21}i}{49} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{14}i}{49} & 0 & \frac{\sqrt{210}i}{98} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{70}i}{49} & 0 & \frac{\sqrt{7}i}{49} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{98} & 0 & \frac{\sqrt{42}i}{49} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{49} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{49} & 0 & \frac{\sqrt{2}i}{14} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{7} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{14} & 0 \end{pmatrix}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{1,2}^{(1,-1;a)}(E)$	$\begin{pmatrix} 0 & -\frac{\sqrt{70}}{98} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{7} & 0 & -\frac{\sqrt{7}}{49} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{70}}{98} & 0 & -\frac{2\sqrt{7}}{49} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{49} & 0 & -\frac{\sqrt{21}}{49} & 0 & 0 & 0 & 0 \\ 0 & -\frac{2\sqrt{7}}{49} & 0 & -\frac{3\sqrt{14}}{98} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{49} & 0 & -\frac{\sqrt{42}}{49} & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{14}}{98} & 0 & -\frac{2\sqrt{7}}{49} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{49} & 0 & -\frac{\sqrt{70}}{49} & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{7}}{49} & 0 & -\frac{\sqrt{70}}{98} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{49} & 0 & -\frac{\sqrt{105}}{49} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{49} & 0 & -\frac{\sqrt{3}}{7} \\ \frac{\sqrt{3}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{105}}{49} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{14} & 0 & \frac{\sqrt{42}}{49} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{7}}{49} & 0 & \frac{\sqrt{70}}{49} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{49} & 0 & \frac{\sqrt{210}}{98} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}}{49} & 0 & \frac{\sqrt{42}}{49} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{98} & 0 & \frac{2\sqrt{14}}{49} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}}{49} & 0 & \frac{\sqrt{21}}{49} & 0 & 0 & 0 & 0 & \frac{2\sqrt{14}}{49} & 0 & \frac{\sqrt{210}}{98} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{70}}{49} & 0 & \frac{\sqrt{7}}{49} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{98} & 0 & \frac{\sqrt{42}}{49} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{49} & 0 & \frac{\sqrt{2}}{14} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{14} & 0 \end{pmatrix}$
971	symmetry	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_3^{(1,-1;a)}(A_1)$	$\begin{pmatrix} 0 & 0 & 0 & \frac{\sqrt{70}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{147} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{2\sqrt{7}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{49} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{98} & -\frac{\sqrt{15}}{21} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{49} & 0 \\ \frac{\sqrt{70}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{49} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{21} \\ 0 & \frac{2\sqrt{7}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{49} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{70}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{147} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{105}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{35}}{49} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}}{49} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{147} & -\frac{\sqrt{5}}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{35}}{49} & 0 \\ \frac{\sqrt{210}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{35}}{49} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{14} \\ 0 & \frac{\sqrt{70}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}}{49} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{105}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{35}}{49} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{14} & 0 & 0 & 0 \end{pmatrix}$
972	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_3^{(1,-1;a)}(A_2,1)$	$\begin{pmatrix} \frac{\sqrt{70}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{4\sqrt{105}}{147} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{2\sqrt{70}}{245} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{210}}{147} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{2\sqrt{70}}{245} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{210}}{147} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{4\sqrt{105}}{147} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{4\sqrt{105}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{70}}{196} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{2\sqrt{210}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{196} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{210}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}}{196} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{4\sqrt{105}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{70}}{196} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{28} \end{pmatrix}$
973	symmetry	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_3^{(1,-1;a)}(A_2,2)$	$\begin{pmatrix} 0 & 0 & 0 & -\frac{\sqrt{70}i}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{147} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{2\sqrt{7}i}{49} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{49} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{98} & -\frac{\sqrt{15}i}{21} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{49} & 0 \\ \frac{\sqrt{70}i}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{49} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{21} \\ 0 & \frac{2\sqrt{7}i}{49} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{49} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{70}i}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{147} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{105}i}{49} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{35}i}{49} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{49} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}i}{49} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{147} & -\frac{\sqrt{5}i}{14} & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{35}i}{49} & 0 \\ \frac{\sqrt{210}i}{147} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{35}i}{49} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{14} \\ 0 & \frac{\sqrt{70}i}{49} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}i}{49} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{105}i}{49} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{35}i}{49} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{14} & 0 & 0 & 0 \end{pmatrix}$
974	symmetry	$\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{3,1}^{(1,-1;a)}(E,1)$	$\begin{pmatrix} 0 & \frac{\sqrt{21}i}{49} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{21} & 0 & \frac{2\sqrt{210}i}{147} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{21}i}{49} & 0 & -\frac{\sqrt{210}i}{490} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}i}{147} & 0 & \frac{2\sqrt{70}i}{147} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{210}i}{490} & 0 & -\frac{2\sqrt{105}i}{245} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{21}i}{147} & 0 & -\frac{\sqrt{35}i}{147} & 0 & 0 & 0 \\ 0 & 0 & \frac{2\sqrt{105}i}{245} & 0 & -\frac{\sqrt{210}i}{490} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{147} & 0 & -\frac{5\sqrt{21}i}{147} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{210}i}{490} & 0 & \frac{\sqrt{21}i}{49} & 0 & 0 & 0 & 0 & \frac{2\sqrt{70}i}{147} & 0 & -\frac{5\sqrt{14}i}{147} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{49} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{210}i}{147} & 0 & \frac{\sqrt{10}i}{21} \\ -\frac{\sqrt{10}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{14}i}{147} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{14} & 0 & -\frac{\sqrt{35}i}{98} & 0 & 0 & 0 & 0 & 0 \\ -\frac{2\sqrt{210}i}{147} & 0 & \frac{5\sqrt{21}i}{147} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{98} & 0 & \frac{5\sqrt{7}i}{98} & 0 & 0 & 0 & 0 \\ 0 & -\frac{2\sqrt{70}i}{147} & 0 & \frac{\sqrt{35}i}{147} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}i}{98} & 0 & \frac{\sqrt{105}i}{49} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{35}i}{147} & 0 & -\frac{2\sqrt{70}i}{147} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{49} & 0 & \frac{5\sqrt{7}i}{98} & 0 & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{21}i}{147} & 0 & -\frac{2\sqrt{210}i}{147} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}i}{98} & 0 & -\frac{\sqrt{35}i}{98} & 0 \\ 0 & 0 & 0 & 0 & \frac{5\sqrt{14}i}{147} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{98} & 0 & -\frac{\sqrt{15}i}{14} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{14} & 0 \end{pmatrix}$
975	symmetry	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{3,2}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{21}}{49} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{21} & 0 & \frac{2\sqrt{210}}{147} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{21}}{49} & 0 & -\frac{\sqrt{210}}{490} & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}}{147} & 0 & \frac{2\sqrt{70}}{147} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}}{490} & 0 & -\frac{2\sqrt{105}}{245} & 0 & 0 & 0 & 0 & \frac{5\sqrt{21}}{147} & 0 & -\frac{\sqrt{35}}{147} & 0 & 0 & 0 \\ 0 & 0 & -\frac{2\sqrt{105}}{245} & 0 & -\frac{\sqrt{210}}{490} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{147} & 0 & -\frac{5\sqrt{21}}{147} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{210}}{490} & 0 & \frac{\sqrt{21}}{49} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{70}}{147} & 0 & -\frac{5\sqrt{14}}{147} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{210}}{147} & 0 & \frac{\sqrt{10}}{21} \\ -\frac{\sqrt{10}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{14}}{147} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{14} & 0 & -\frac{\sqrt{35}}{98} & 0 & 0 & 0 & 0 & 0 \\ \frac{2\sqrt{210}}{147} & 0 & \frac{5\sqrt{21}}{147} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{98} & 0 & \frac{5\sqrt{7}}{98} & 0 & 0 & 0 & 0 \\ 0 & \frac{2\sqrt{70}}{147} & 0 & \frac{\sqrt{35}}{147} & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}}{98} & 0 & \frac{\sqrt{105}}{49} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{35}}{147} & 0 & -\frac{2\sqrt{70}}{147} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{49} & 0 & \frac{5\sqrt{7}}{98} & 0 & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{21}}{147} & 0 & -\frac{2\sqrt{210}}{147} & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}}{98} & 0 & -\frac{\sqrt{35}}{98} & 0 \\ 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{98} & 0 & -\frac{\sqrt{15}}{14} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{14} & 0 \end{bmatrix}$
976	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{105}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{4\sqrt{35}}{147} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}}{98} & 0 & 0 & \frac{2\sqrt{5}}{21} & 0 & 0 & 0 & -\frac{10\sqrt{7}}{147} & 0 & 0 & 0 \\ -\frac{\sqrt{105}}{98} & 0 & 0 & 0 & \frac{\sqrt{21}}{98} & 0 & 0 & \frac{\sqrt{70}}{147} & 0 & 0 & 0 & -\frac{\sqrt{210}}{147} & 0 & 0 \\ 0 & -\frac{\sqrt{21}}{98} & 0 & 0 & 0 & \frac{\sqrt{105}}{98} & 0 & 0 & -\frac{\sqrt{210}}{147} & 0 & 0 & 0 & \frac{\sqrt{70}}{147} & 0 \\ 0 & 0 & \frac{\sqrt{21}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{10\sqrt{7}}{147} & 0 & 0 & 0 & \frac{2\sqrt{5}}{21} \\ 0 & 0 & 0 & \frac{\sqrt{105}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{4\sqrt{35}}{147} & 0 & 0 & 0 \\ 0 & \frac{2\sqrt{5}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{70}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{210}}{196} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{210}}{147} & 0 & 0 & \frac{5\sqrt{2}}{28} & 0 & 0 & 0 & \frac{\sqrt{70}}{98} & 0 & 0 & 0 \\ -\frac{4\sqrt{35}}{147} & 0 & 0 & 0 & -\frac{10\sqrt{7}}{147} & 0 & 0 & \frac{3\sqrt{210}}{196} & 0 & 0 & 0 & -\frac{\sqrt{70}}{98} & 0 & 0 \\ 0 & -\frac{10\sqrt{7}}{147} & 0 & 0 & 0 & -\frac{4\sqrt{35}}{147} & 0 & 0 & \frac{\sqrt{70}}{98} & 0 & 0 & 0 & -\frac{3\sqrt{210}}{196} & 0 \\ 0 & 0 & -\frac{\sqrt{210}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{98} & 0 & 0 & 0 & -\frac{5\sqrt{2}}{28} \\ 0 & 0 & 0 & \frac{\sqrt{70}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{210}}{196} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{2\sqrt{5}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{2}}{28} & 0 & 0 \end{bmatrix}$
977	symmetry	$\sqrt{15}xyz$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)$	$\begin{pmatrix} 0 & 0 & -\frac{\sqrt{105}i}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{4\sqrt{35}i}{147} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}i}{98} & 0 & 0 & -\frac{2\sqrt{5}i}{21} & 0 & 0 & 0 & -\frac{10\sqrt{7}i}{147} & 0 & 0 & 0 \\ \frac{\sqrt{105}i}{98} & 0 & 0 & 0 & \frac{\sqrt{21}i}{98} & 0 & 0 & -\frac{\sqrt{70}i}{147} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{147} & 0 & 0 \\ 0 & \frac{\sqrt{21}i}{98} & 0 & 0 & 0 & \frac{\sqrt{105}i}{98} & 0 & 0 & \frac{\sqrt{210}i}{147} & 0 & 0 & 0 & \frac{\sqrt{70}i}{147} & 0 \\ 0 & 0 & -\frac{\sqrt{21}i}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{10\sqrt{7}i}{147} & 0 & 0 & 0 & \frac{2\sqrt{5}i}{21} \\ 0 & 0 & 0 & -\frac{\sqrt{105}i}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{4\sqrt{35}i}{147} & 0 & 0 & 0 \\ 0 & \frac{2\sqrt{5}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{70}i}{147} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{210}i}{196} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{210}i}{147} & 0 & 0 & -\frac{5\sqrt{2}i}{28} & 0 & 0 & 0 & \frac{\sqrt{70}i}{98} & 0 & 0 & 0 \\ \frac{4\sqrt{35}i}{147} & 0 & 0 & 0 & -\frac{10\sqrt{7}i}{147} & 0 & 0 & -\frac{3\sqrt{210}i}{196} & 0 & 0 & 0 & -\frac{\sqrt{70}i}{98} & 0 & 0 \\ 0 & \frac{10\sqrt{7}i}{147} & 0 & 0 & 0 & -\frac{4\sqrt{35}i}{147} & 0 & 0 & -\frac{\sqrt{70}i}{98} & 0 & 0 & 0 & -\frac{3\sqrt{210}i}{196} & 0 \\ 0 & 0 & \frac{\sqrt{210}i}{147} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{98} & 0 & 0 & 0 & -\frac{5\sqrt{2}i}{28} \\ 0 & 0 & 0 & -\frac{\sqrt{70}i}{147} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{210}i}{196} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{2\sqrt{5}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{2}i}{28} & 0 & 0 \end{pmatrix}$
978	symmetry	$-\frac{\sqrt{70}x\left(x^2-3y^2\right)\left(x^2+y^2-8z^2\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(1,-1;a)}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{55}}{231} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{77} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{5\sqrt{22}}{462} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{55}}{385} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{55}}{231} & \frac{\sqrt{2310}}{385} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{330}}{385} & 0 \\ -\frac{\sqrt{55}}{231} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{330}}{385} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{385} \\ 0 & \frac{5\sqrt{22}}{462} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{55}}{385} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{55}}{231} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{77} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2310}}{385} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{770}}{77} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{330}}{385} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}}{154} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{55}}{385} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{22}}{77} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{77} & \frac{\sqrt{770}}{77} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}}{154} & 0 \\ -\frac{\sqrt{165}}{77} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}}{154} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{770}}{77} \\ 0 & \frac{3\sqrt{55}}{385} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{22}}{77} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{330}}{385} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}}{154} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2310}}{385} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{770}}{77} & 0 & 0 & 0 \end{bmatrix}$
979	symmetry	$\frac{z\left(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(1,-1;a)}(A_2,1)$	$\begin{pmatrix} -\frac{\sqrt{385}}{3234} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{539} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{385}}{3234} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{154}}{539} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{385}}{1617} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{1155}}{539} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{385}}{1617} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{1155}}{539} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{5\sqrt{385}}{3234} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{154}}{539} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{385}}{3234} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{539} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{385}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2310}}{539} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{23\sqrt{385}}{1078} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{9\sqrt{154}}{539} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{17\sqrt{385}}{1078} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{2\sqrt{1155}}{539} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{15\sqrt{385}}{1078} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{1155}}{539} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{15\sqrt{385}}{1078} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{9\sqrt{154}}{539} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{17\sqrt{385}}{1078} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{539} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{23\sqrt{385}}{1078} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}}{154} \end{pmatrix}$
980	symmetry	$-\frac{\sqrt{70}y\left(3x^2-y^2\right)\left(x^2+y^2-8z^2\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(1,-1;a)}(A_2,2)$	$\begin{pmatrix} 0 & 0 & 0 & \frac{\sqrt{55}i}{231} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}i}{77} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{5\sqrt{22}i}{462} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{55}i}{385} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{55}i}{231} & \frac{\sqrt{2310}i}{385} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{330}i}{385} & 0 \\ -\frac{\sqrt{55}i}{231} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{330}i}{385} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}i}{385} \\ 0 & \frac{5\sqrt{22}i}{462} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{55}i}{385} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{55}i}{231} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}i}{77} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2310}i}{385} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}i}{77} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{330}i}{385} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}i}{154} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{55}i}{385} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{22}i}{77} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{77} & \frac{\sqrt{770}i}{77} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}i}{154} & 0 \\ -\frac{\sqrt{165}i}{77} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}i}{154} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}i}{77} \\ 0 & \frac{3\sqrt{55}i}{385} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{22}i}{77} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{330}i}{385} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}i}{154} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2310}i}{385} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{770}i}{77} & 0 & 0 & 0 \end{pmatrix}$
981	symmetry	$\frac{3\sqrt{14}y\left(5x^4-10x^2y^2+y^4\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{5,1}^{(1,-1;a)}(E,1)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}i}{77} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{231}i}{77} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{231}i}{77} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{110}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}i}{77} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{231}i}{77} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{154} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{77} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{110}i}{77} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{154} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{165}i}{77} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{110}i}{77} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{231}i}{77} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}i}{154} & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
982	symmetry	$\frac{3\sqrt{14}x\left(x^4-10x^2y^2+5y^4\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{5,2}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{77} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}}{77} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{231}}{77} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{110}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{77} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{231}}{77} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{154} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{77} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{110}}{77} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{154} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{165}}{77} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{110}}{77} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{231}}{77} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{154} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
983	symmetry	$-\frac{\sqrt{15}y\left(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{5,1}^{(1,-1;a)}(E,2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{1155}i}{3234} & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}i}{154} & 0 & -\frac{5\sqrt{462}i}{1078} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{1155}i}{3234} & 0 & \frac{5\sqrt{462}i}{3234} & 0 & 0 & 0 & 0 & \frac{23\sqrt{770}i}{5390} & 0 & \frac{13\sqrt{154}i}{1078} & 0 & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{462}i}{3234} & 0 & -\frac{5\sqrt{231}i}{1617} & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}i}{245} & 0 & -\frac{\sqrt{77}i}{539} & 0 & 0 & 0 \\ 0 & 0 & \frac{5\sqrt{231}i}{1617} & 0 & \frac{5\sqrt{462}i}{3234} & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}i}{539} & 0 & -\frac{\sqrt{1155}i}{245} & 0 & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{462}i}{3234} & 0 & -\frac{\sqrt{1155}i}{3234} & 0 & 0 & 0 & 0 & \frac{13\sqrt{154}i}{1078} & 0 & \frac{23\sqrt{770}i}{5390} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{1155}i}{3234} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{462}i}{1078} & 0 & -\frac{\sqrt{22}i}{154} \\ \frac{\sqrt{22}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{33}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{23\sqrt{770}i}{5390} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{33}i}{154} & 0 & -\frac{20\sqrt{77}i}{539} & 0 & 0 & 0 & 0 & 0 \\ \frac{5\sqrt{462}i}{1078} & 0 & \frac{\sqrt{1155}i}{245} & 0 & 0 & 0 & 0 & \frac{20\sqrt{77}i}{539} & 0 & \frac{\sqrt{385}i}{1078} & 0 & 0 & 0 & 0 \\ 0 & -\frac{13\sqrt{154}i}{1078} & 0 & \frac{\sqrt{77}i}{539} & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}i}{1078} & 0 & \frac{10\sqrt{231}i}{539} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{77}i}{539} & 0 & -\frac{13\sqrt{154}i}{1078} & 0 & 0 & 0 & 0 & -\frac{10\sqrt{231}i}{539} & 0 & \frac{\sqrt{385}i}{1078} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{1155}i}{245} & 0 & \frac{5\sqrt{462}i}{1078} & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}i}{1078} & 0 & -\frac{20\sqrt{77}i}{539} & 0 \\ 0 & 0 & 0 & 0 & -\frac{23\sqrt{770}i}{5390} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{20\sqrt{77}i}{539} & 0 & \frac{5\sqrt{33}i}{154} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{33}i}{154} & 0 \end{bmatrix}$
984	symmetry	$\frac{\sqrt{15}x\left(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{5,2}^{(1,-1;a)}(E,2)$	$\begin{pmatrix} 0 & -\frac{\sqrt{1155}}{3234} & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{154} & 0 & -\frac{5\sqrt{462}}{1078} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{1155}}{3234} & 0 & \frac{5\sqrt{462}}{3234} & 0 & 0 & 0 & 0 & -\frac{23\sqrt{770}}{5390} & 0 & \frac{13\sqrt{154}}{1078} & 0 & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{462}}{3234} & 0 & -\frac{5\sqrt{231}}{1617} & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{245} & 0 & -\frac{\sqrt{77}}{539} & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{231}}{1617} & 0 & \frac{5\sqrt{462}}{3234} & 0 & 0 & 0 & 0 & \frac{\sqrt{77}}{539} & 0 & -\frac{\sqrt{1155}}{245} & 0 & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{462}}{3234} & 0 & -\frac{\sqrt{1155}}{3234} & 0 & 0 & 0 & 0 & -\frac{13\sqrt{154}}{1078} & 0 & \frac{23\sqrt{770}}{5390} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}}{3234} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{462}}{1078} & 0 & -\frac{\sqrt{22}}{154} \\ \frac{\sqrt{22}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{33}}{154} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{23\sqrt{770}}{5390} & 0 & 0 & 0 & 0 & \frac{5\sqrt{33}}{154} & 0 & -\frac{20\sqrt{77}}{539} & 0 & 0 & 0 & 0 & 0 \\ -\frac{5\sqrt{462}}{1078} & 0 & \frac{\sqrt{1155}}{245} & 0 & 0 & 0 & 0 & -\frac{20\sqrt{77}}{539} & 0 & \frac{\sqrt{385}}{1078} & 0 & 0 & 0 & 0 \\ 0 & \frac{13\sqrt{154}}{1078} & 0 & \frac{\sqrt{77}}{539} & 0 & 0 & 0 & 0 & \frac{\sqrt{385}}{1078} & 0 & \frac{10\sqrt{231}}{539} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{77}}{539} & 0 & -\frac{13\sqrt{154}}{1078} & 0 & 0 & 0 & 0 & \frac{10\sqrt{231}}{539} & 0 & \frac{\sqrt{385}}{1078} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{1155}}{245} & 0 & \frac{5\sqrt{462}}{1078} & 0 & 0 & 0 & 0 & \frac{\sqrt{385}}{1078} & 0 & -\frac{20\sqrt{77}}{539} & 0 \\ 0 & 0 & 0 & 0 & \frac{23\sqrt{770}}{5390} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{20\sqrt{77}}{539} & 0 & \frac{5\sqrt{33}}{154} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{33}}{154} & 0 \end{pmatrix}$
985	symmetry	$-\frac{3\sqrt{35}z\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{5,1}^{(1,-1;a)}(E,3)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{55}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{22}}{77} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{55}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{385} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{1155}}{385} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{1155}}{385} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{55}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{385} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{55}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{22}}{77} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{1155}}{385} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{385}}{154} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{385} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{33}}{154} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{22}}{77} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{33}}{154} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{385}}{154} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{385}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{22}}{77} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{33}}{154} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{330}}{385} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{33}}{154} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{2\sqrt{1155}}{385} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{385}}{154} & 0 & 0 & 0 & 0 \end{pmatrix}$
986	symmetry	$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{5,2}^{(1,-1;a)}(E,3)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{55}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{22}i}{77} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{55}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{385} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{1155}i}{385} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{1155}i}{385} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{55}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}i}{385} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{55}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{22}i}{77} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{2\sqrt{1155}i}{385} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{385}i}{154} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{385} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{33}i}{154} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{22}i}{77} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{33}i}{154} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{385}i}{154} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{385}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{22}i}{77} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{33}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{330}i}{385} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{33}i}{154} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{2\sqrt{1155}i}{385} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{385}i}{154} & 0 & 0 & 0 & 0 \end{pmatrix}$
987	symmetry	$\frac{\sqrt{105}z(x-y)(x+y)\left(x^2+y^2-2z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{5,1}^{(1,-1;a)}(E,4)$	$\begin{pmatrix} 0 & 0 & \frac{\sqrt{330}}{924} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}}{77} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{66}}{924} & 0 & 0 & -\frac{\sqrt{770}}{385} & 0 & 0 & 0 & -\frac{2\sqrt{22}}{77} & 0 & 0 & 0 \\ \frac{\sqrt{330}}{924} & 0 & 0 & 0 & \frac{5\sqrt{66}}{924} & 0 & 0 & \frac{8\sqrt{55}}{385} & 0 & 0 & 0 & -\frac{2\sqrt{165}}{385} & 0 & 0 \\ 0 & -\frac{5\sqrt{66}}{924} & 0 & 0 & 0 & -\frac{\sqrt{330}}{924} & 0 & 0 & -\frac{2\sqrt{165}}{385} & 0 & 0 & 0 & \frac{8\sqrt{55}}{385} & 0 \\ 0 & 0 & \frac{5\sqrt{66}}{924} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{22}}{77} & 0 & 0 & 0 & -\frac{\sqrt{770}}{385} \\ 0 & 0 & 0 & -\frac{\sqrt{330}}{924} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}}{77} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{770}}{385} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{77}}{154} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{8\sqrt{55}}{385} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{165}}{154} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{165}}{385} & 0 & 0 & -\frac{5\sqrt{77}}{154} & 0 & 0 & 0 & \frac{2\sqrt{55}}{77} & 0 & 0 & 0 \\ \frac{\sqrt{110}}{77} & 0 & 0 & 0 & -\frac{2\sqrt{22}}{77} & 0 & 0 & \frac{3\sqrt{165}}{154} & 0 & 0 & 0 & -\frac{2\sqrt{55}}{77} & 0 & 0 \\ 0 & -\frac{2\sqrt{22}}{77} & 0 & 0 & 0 & \frac{\sqrt{110}}{77} & 0 & 0 & \frac{2\sqrt{55}}{77} & 0 & 0 & 0 & -\frac{3\sqrt{165}}{154} & 0 \\ 0 & 0 & -\frac{2\sqrt{165}}{385} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{55}}{77} & 0 & 0 & 0 & \frac{5\sqrt{77}}{154} \\ 0 & 0 & 0 & \frac{8\sqrt{55}}{385} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{165}}{154} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{770}}{385} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{77}}{154} & 0 & 0 \end{pmatrix}$
988	symmetry	$-\frac{\sqrt{105}xyz\left(x^2+y^2-2z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{5,2}^{(1,-1;a)}(E,4)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{330}i}{924} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}i}{77} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{66}i}{924} & 0 & 0 & \frac{\sqrt{770}i}{385} & 0 & 0 & 0 & -\frac{2\sqrt{22}i}{77} & 0 & 0 & 0 \\ -\frac{\sqrt{330}i}{924} & 0 & 0 & 0 & \frac{5\sqrt{66}i}{924} & 0 & 0 & -\frac{8\sqrt{55}i}{385} & 0 & 0 & 0 & -\frac{2\sqrt{165}i}{385} & 0 & 0 \\ 0 & \frac{5\sqrt{66}i}{924} & 0 & 0 & 0 & -\frac{\sqrt{330}i}{924} & 0 & 0 & \frac{2\sqrt{165}i}{385} & 0 & 0 & 0 & \frac{8\sqrt{55}i}{385} & 0 \\ 0 & 0 & -\frac{5\sqrt{66}i}{924} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{22}i}{77} & 0 & 0 & 0 & -\frac{\sqrt{770}i}{385} \\ 0 & 0 & 0 & \frac{\sqrt{330}i}{924} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}i}{77} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{770}i}{385} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{77}i}{154} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{8\sqrt{55}i}{385} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{165}i}{154} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{165}i}{385} & 0 & 0 & \frac{5\sqrt{77}i}{154} & 0 & 0 & 0 & \frac{2\sqrt{55}i}{77} & 0 & 0 & 0 \\ -\frac{\sqrt{110}i}{77} & 0 & 0 & 0 & -\frac{2\sqrt{22}i}{77} & 0 & 0 & -\frac{3\sqrt{165}i}{154} & 0 & 0 & 0 & -\frac{2\sqrt{55}i}{77} & 0 & 0 \\ 0 & \frac{2\sqrt{22}i}{77} & 0 & 0 & 0 & \frac{\sqrt{110}i}{77} & 0 & 0 & -\frac{2\sqrt{55}i}{77} & 0 & 0 & 0 & -\frac{3\sqrt{165}i}{154} & 0 \\ 0 & 0 & \frac{2\sqrt{165}i}{385} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{55}i}{77} & 0 & 0 & 0 & \frac{5\sqrt{77}i}{154} \\ 0 & 0 & 0 & -\frac{8\sqrt{55}i}{385} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{165}i}{154} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{770}i}{385} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{77}i}{154} & 0 & 0 \end{bmatrix}$
989	symmetry	$\frac{\sqrt{6006}xyz\left(x^2-3y^2\right)\left(3x^2-y^2\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_7^{(1,-1;a)}(A_1,1)$	$\begin{bmatrix} 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&\frac{i}{2}&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&0&-\frac{i}{2}\\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&-\frac{i}{2}&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&\frac{i}{2}&0&0&0&0&0&0 \end{bmatrix}$
990	symmetry	$\frac{\sqrt{21}x\left(x^2-3y^2\right)\left(3x^4+6x^2y^2-60x^2z^2+3y^4-60y^2z^2+80z^4\right)}{32}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_7^{(1,-1;a)}(A_1,2)$	$\left[\begin{array}{cccccccccccccc} 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&-\frac{\sqrt{1430}}{286}&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&\frac{\sqrt{10010}}{286}&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&-\frac{3\sqrt{2002}}{286}&0&0\\ 0&0&0&0&0&0&-\frac{\sqrt{1430}}{286}&0&0&0&0&0&\frac{\sqrt{10010}}{286}&0\\ 0&0&0&0&0&0&0&\frac{\sqrt{10010}}{286}&0&0&0&0&0&-\frac{\sqrt{1430}}{286}\\ 0&0&0&0&0&0&0&0&-\frac{3\sqrt{2002}}{286}&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&\frac{\sqrt{10010}}{286}&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&-\frac{\sqrt{1430}}{286}&0&0&0 \end{array}\right]$
991	symmetry	$-\frac{z\left(35x^6+105x^4y^2-210x^4z^2+105x^2y^4-420x^2y^2z^2+168x^2z^4+35y^6-210y^4z^2+168y^2z^4-16z^6\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_7^{(1,-1;a)}(A_2,1)$	$\begin{bmatrix} 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&-\frac{\sqrt{858}}{1716}&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&\frac{7\sqrt{858}}{1716}&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&-\frac{7\sqrt{858}}{572}&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&\frac{35\sqrt{858}}{1716}&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&-\frac{35\sqrt{858}}{1716}&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&\frac{7\sqrt{858}}{572}&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&-\frac{7\sqrt{858}}{1716}&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&0&\frac{\sqrt{858}}{1716} \end{bmatrix}$
992	symmetry	$\frac{\sqrt{6006}z(x-y)(x+y)\left(x^2-4xy+y^2\right)\left(x^2+4xy+y^2\right)}{32}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_7^{(1,-1;a)}(A_2,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
993	symmetry	$\frac{\sqrt{21}y\left(3x^2-y^2\right)\left(3x^4+6x^2y^2-60x^2z^2+3y^4-60y^2z^2+80z^4\right)}{32}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_7^{(1,-1;a)}(A_2,3)$	$\left[\begin{array}{cccccccccccccc} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1430}i}{286} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10010}i}{286} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2002}i}{286} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1430}i}{286} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10010}i}{286} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10010}i}{286} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1430}i}{286} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2002}i}{286} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10010}i}{286} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1430}i}{286} & 0 & 0 & 0 \end{array}\right]$
994	symmetry	$-\frac{\sqrt{429}y\left(7x^6-35x^4y^2+21x^2y^4-y^6\right)}{32}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{7,1}^{(1,-1;a)}(E,1)$	$\left[\begin{array}{cccccccccccccc} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{array}\right]$
995	symmetry	$\frac{\sqrt{429}x\left(x^{6}-21x^{4}y^{2}+35x^{2}y^{4}-7y^{6}\right)}{32}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{7,2}^{(1,-1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
996	symmetry	$-\frac{\sqrt{231}y\left(x^2+y^2-12z^2\right)\left(5x^4-10x^2y^2+y^4\right)}{32}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{7,1}^{(1,-1;a)}(E,2)$	$\left[\begin{array}{cccccccccccccc} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{78}i}{26} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{182}i}{26} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{78}i}{26} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{78}i}{26} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{182}i}{26} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{78}i}{26} & 0 & 0 & 0 & 0 & 0 \end{array}\right]$
997	symmetry	$-\frac{\sqrt{231}x\left(x^{2}+y^{2}-12z^{2}\right)\left(x^{4}-10x^{2}y^{2}+5y^{4}\right)}{32}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{7,2}^{(1,-1;a)}(E,2)$	$\left[\begin{array}{cccccccccccccc} 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&-\frac{\sqrt{78}}{26}&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&\frac{\sqrt{182}}{26}&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&0&-\frac{\sqrt{78}}{26}\\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&-\frac{\sqrt{78}}{26}&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&\frac{\sqrt{182}}{26}&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&-\frac{\sqrt{78}}{26}&0&0&0&0&0 \end{array}\right]$
998	symmetry	$\frac{\sqrt{7}y\left(5x^{6}+15x^{4}y^{2}-120x^{4}z^{2}+15x^{2}y^{4}-240x^{2}y^{2}z^{2}+240x^{2}z^{4}+5y^{6}-120y^{4}z^{2}+240y^{2}z^{4}-64z^{6}\right)}{32}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{7,1}^{(1,-1;a)}(E,3)$	$\left[\begin{array}{cccccccccccccc} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{858}i}{858} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{858}i}{858} & 0 & \frac{\sqrt{2002}i}{286} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2002}i}{286} & 0 & -\frac{\sqrt{10010}i}{286} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10010}i}{286} & 0 & \frac{5\sqrt{6006}i}{858} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6006}i}{858} & 0 & -\frac{\sqrt{10010}i}{286} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10010}i}{286} & 0 & \frac{\sqrt{2002}i}{286} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2002}i}{286} & 0 & -\frac{\sqrt{858}i}{858} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{858}i}{858} & 0 \end{array}\right]$
999	symmetry	$-\frac{\sqrt{7}x\left(5x^6+15x^4y^2-120x^4z^2+15x^2y^4-240x^2y^2z^2+240x^2z^4+5y^6-120y^4z^2+240y^2z^4-64z^6\right)}{32}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{7,2}^{(1,-1;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{858}}{858} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{858}}{858} & 0 & \frac{\sqrt{2002}}{286} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2002}}{286} & 0 & -\frac{\sqrt{10010}}{286} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10010}}{286} & 0 & \frac{5\sqrt{6006}}{858} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6006}}{858} & 0 & -\frac{\sqrt{10010}}{286} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10010}}{286} & 0 & \frac{\sqrt{2002}}{286} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2002}}{286} & 0 & -\frac{\sqrt{858}}{858} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{858}}{858} & 0 \end{bmatrix}$
1000	symmetry	$\frac{\sqrt{231}z\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)\left(3x^2+3y^2-10z^2\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{7,1}^{(1,-1;a)}(E,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{130}}{52} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{546}}{52} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{546}}{52} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{130}}{52} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{130}}{52} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{546}}{52} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{546}}{52} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{130}}{52} & 0 & 0 & 0 & 0 \end{bmatrix}$
1001	symmetry	$\frac{\sqrt{231}xyz(x-y)(x+y)\left(3x^2+3y^2-10z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{7,2}^{(1,-1;a)}(E,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{130}i}{52} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{546}i}{52} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{546}i}{52} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{130}i}{52} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{130}i}{52} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{546}i}{52} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{546}i}{52} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{130}i}{52} & 0 & 0 & 0 & 0 \end{bmatrix}$
1002	symmetry	$-\frac{\sqrt{42}z(x-y)(x+y)\left(15x^4+30x^2y^2-80x^2z^2+15y^4-80y^2z^2+48z^4\right)}{32}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{7,1}^{(1,-1;a)}(E,5)$	$\left[\begin{array}{cccccccccccccc} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{429}}{286} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5005}}{286} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{429}}{286} & 0 & 0 & 0 & \frac{\sqrt{15015}}{286} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5005}}{286} & 0 & 0 & 0 & -\frac{\sqrt{15015}}{286} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15015}}{286} & 0 & 0 & 0 & \frac{\sqrt{5005}}{286} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15015}}{286} & 0 & 0 & 0 & -\frac{\sqrt{429}}{286} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5005}}{286} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{429}}{286} & 0 & 0 \end{array}\right]$
1003	symmetry	$\frac{\sqrt{42}xyz\left(15x^4+30x^2y^2-80x^2z^2+15y^4-80y^2z^2+48z^4\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{7,2}^{(1,-1;a)}(E,5)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{429}i}{286} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5005}i}{286} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{429}i}{286} & 0 & 0 & 0 & \frac{\sqrt{15015}i}{286} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5005}i}{286} & 0 & 0 & 0 & -\frac{\sqrt{15015}i}{286} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15015}i}{286} & 0 & 0 & 0 & \frac{\sqrt{5005}i}{286} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15015}i}{286} & 0 & 0 & 0 & -\frac{\sqrt{429}i}{286} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5005}i}{286} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{429}i}{286} & 0 & 0 \end{bmatrix}$
1004	symmetry	z

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_1^{(1,1;a)}(A_2)$	$\begin{pmatrix} \frac{2\sqrt{105}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}}{196} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{6\sqrt{105}}{245} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{196} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{2\sqrt{105}}{245} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}}{98} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{105}}{245} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}}{98} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{6\sqrt{105}}{245} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{196} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{105}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}}{196} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{70}}{196} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{105}}{294} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{42}}{196} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{98} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{35}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{294} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{35}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{294} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{196} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{98} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}}{196} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{105}}{294} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} \end{pmatrix}$
1005	symmetry	$-y$

continued ...

Table 10

No.	multipole	matrix
1006	symmetry	x

$\mathbb{M}^{(1,1;a)}_{1,1}(E)$

$$\begin{pmatrix}
0 & \frac{2\sqrt{21}i}{49} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{56} & 0 & -\frac{\sqrt{210}i}{392} & 0 & 0 & 0 & 0 & 0 \\
-\frac{2\sqrt{21}i}{49} & 0 & \frac{4\sqrt{210}i}{245} & 0 & 0 & 0 & 0 & -\frac{15\sqrt{14}i}{392} & 0 & -\frac{3\sqrt{70}i}{392} & 0 & 0 & 0 & 0 \\
0 & -\frac{4\sqrt{210}i}{245} & 0 & \frac{6\sqrt{105}i}{245} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{21}i}{196} & 0 & -\frac{3\sqrt{35}i}{196} & 0 & 0 & 0 \\
0 & 0 & -\frac{6\sqrt{105}i}{245} & 0 & \frac{4\sqrt{210}i}{245} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}i}{196} & 0 & -\frac{5\sqrt{21}i}{196} & 0 & 0 \\
0 & 0 & 0 & -\frac{4\sqrt{210}i}{245} & 0 & \frac{2\sqrt{21}i}{49} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}i}{392} & 0 & -\frac{15\sqrt{14}i}{392} & 0 \\
0 & 0 & 0 & 0 & -\frac{2\sqrt{21}i}{49} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{392} & 0 & -\frac{3\sqrt{10}i}{56} \\
\frac{3\sqrt{10}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & \frac{15\sqrt{14}i}{392} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{42} & 0 & -\frac{\sqrt{35}i}{49} & 0 & 0 & 0 & 0 & 0 \\
\frac{\sqrt{210}i}{392} & 0 & \frac{5\sqrt{21}i}{196} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{49} & 0 & -\frac{5\sqrt{7}i}{98} & 0 & 0 & 0 & 0 \\
0 & \frac{3\sqrt{70}i}{392} & 0 & \frac{3\sqrt{35}i}{196} & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}i}{98} & 0 & -\frac{2\sqrt{105}i}{147} & 0 & 0 & 0 \\
0 & 0 & \frac{3\sqrt{35}i}{196} & 0 & \frac{3\sqrt{70}i}{392} & 0 & 0 & 0 & 0 & \frac{2\sqrt{105}i}{147} & 0 & -\frac{5\sqrt{7}i}{98} & 0 & 0 \\
0 & 0 & 0 & \frac{5\sqrt{21}i}{196} & 0 & \frac{\sqrt{210}i}{392} & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}i}{98} & 0 & -\frac{\sqrt{35}i}{49} & 0 \\
0 & 0 & 0 & 0 & \frac{15\sqrt{14}i}{392} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{49} & 0 & -\frac{\sqrt{15}i}{42} \\
0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{42} & 0
\end{pmatrix}$$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{1,2}^{(1,1;a)}(E)$	$\begin{pmatrix} 0 & \frac{2\sqrt{21}}{49} & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{56} & 0 & -\frac{\sqrt{210}}{392} & 0 & 0 & 0 & 0 & 0 \\ \frac{2\sqrt{21}}{49} & 0 & \frac{4\sqrt{210}}{245} & 0 & 0 & 0 & 0 & \frac{15\sqrt{14}}{392} & 0 & -\frac{3\sqrt{70}}{392} & 0 & 0 & 0 & 0 \\ 0 & \frac{4\sqrt{210}}{245} & 0 & \frac{6\sqrt{105}}{245} & 0 & 0 & 0 & 0 & \frac{5\sqrt{21}}{196} & 0 & -\frac{3\sqrt{35}}{196} & 0 & 0 & 0 \\ 0 & 0 & \frac{6\sqrt{105}}{245} & 0 & \frac{4\sqrt{210}}{245} & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}}{196} & 0 & -\frac{5\sqrt{21}}{196} & 0 & 0 \\ 0 & 0 & 0 & \frac{4\sqrt{210}}{245} & 0 & \frac{2\sqrt{21}}{49} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{392} & 0 & -\frac{15\sqrt{14}}{392} & 0 \\ 0 & 0 & 0 & 0 & \frac{2\sqrt{21}}{49} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{392} & 0 & -\frac{3\sqrt{10}}{56} \\ \frac{3\sqrt{10}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{42} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{15\sqrt{14}}{392} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{42} & 0 & -\frac{\sqrt{35}}{49} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{210}}{392} & 0 & \frac{5\sqrt{21}}{196} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{49} & 0 & -\frac{5\sqrt{7}}{98} & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{70}}{392} & 0 & \frac{3\sqrt{35}}{196} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}}{98} & 0 & -\frac{2\sqrt{105}}{147} & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{35}}{196} & 0 & \frac{3\sqrt{70}}{392} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{105}}{147} & 0 & -\frac{5\sqrt{7}}{98} & 0 & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{21}}{196} & 0 & \frac{\sqrt{210}}{392} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}}{98} & 0 & -\frac{\sqrt{35}}{49} & 0 \\ 0 & 0 & 0 & 0 & -\frac{15\sqrt{14}}{392} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{49} & 0 & -\frac{\sqrt{15}}{42} \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{42} & 0 \end{pmatrix}$
1007	symmetry	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_3^{(1,1;a)}(A_1)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{5\sqrt{77}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{231}}{196} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{2\sqrt{770}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{77}}{196} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{77}}{147} & -\frac{\sqrt{66}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{462}}{392} & 0 \\ -\frac{5\sqrt{77}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{462}}{392} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{66}}{56} \\ 0 & -\frac{2\sqrt{770}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{77}}{196} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{77}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}}{196} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{66}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{77} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{462}}{392} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{4\sqrt{154}}{539} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{77}}{196} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{770}}{539} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}}{196} & \frac{\sqrt{22}}{77} & 0 & 0 & 0 & 0 & 0 & \frac{4\sqrt{154}}{539} & 0 \\ \frac{\sqrt{231}}{196} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{4\sqrt{154}}{539} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{77} \\ 0 & \frac{3\sqrt{77}}{196} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{770}}{539} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{462}}{392} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{4\sqrt{154}}{539} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{66}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{77} & 0 & 0 & 0 \end{bmatrix}$
1008	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_3^{(1,1;a)}(A_2,1)$	$\begin{bmatrix} -\frac{5\sqrt{77}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{462}}{98} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{77}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{4\sqrt{77}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}}{98} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{4\sqrt{77}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}}{98} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{77}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{77}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{462}}{98} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}}{77} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{462}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{77}}{539} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}}{77} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{231}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{77}}{539} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{231}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{77}}{539} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}}{77} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{462}}{98} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{77}}{539} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}}{77} \end{bmatrix}$
1009	symmetry	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_3^{(1,1;a)}(A_2,2)$	$\begin{pmatrix} 0 & 0 & 0 & \frac{5\sqrt{77}i}{147} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}i}{196} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{2\sqrt{770}i}{147} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{77}i}{196} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{77}i}{147} & -\frac{\sqrt{66}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{462}i}{392} & 0 \\ -\frac{5\sqrt{77}i}{147} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{462}i}{392} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}i}{56} \\ 0 & -\frac{2\sqrt{770}i}{147} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{77}i}{196} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{77}i}{147} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}i}{196} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{66}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}i}{77} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{462}i}{392} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{4\sqrt{154}i}{539} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{77}i}{196} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{770}i}{539} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{231}i}{196} & \frac{\sqrt{22}i}{77} & 0 & 0 & 0 & 0 & 0 & -\frac{4\sqrt{154}i}{539} & 0 \\ \frac{\sqrt{231}i}{196} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{4\sqrt{154}i}{539} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}i}{77} \\ 0 & \frac{3\sqrt{77}i}{196} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{770}i}{539} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{462}i}{392} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{4\sqrt{154}i}{539} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{66}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}i}{77} & 0 & 0 & 0 \end{pmatrix}$
1010	symmetry	$\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{3,1}^{(1,1;a)}(E,1)$	$\begin{pmatrix} 0 & -\frac{\sqrt{2310}i}{147} & 0 & 0 & 0 & 0 & \frac{\sqrt{11}i}{28} & 0 & \frac{\sqrt{231}i}{98} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2310}i}{147} & 0 & \frac{\sqrt{231}i}{147} & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}i}{196} & 0 & \frac{\sqrt{77}i}{98} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{231}i}{147} & 0 & \frac{2\sqrt{462}i}{147} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{392} & 0 & -\frac{\sqrt{154}i}{392} & 0 & 0 & 0 \\ 0 & 0 & -\frac{2\sqrt{462}i}{147} & 0 & \frac{\sqrt{231}i}{147} & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}i}{392} & 0 & -\frac{\sqrt{2310}i}{392} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{231}i}{147} & 0 & -\frac{\sqrt{2310}i}{147} & 0 & 0 & 0 & 0 & \frac{\sqrt{77}i}{98} & 0 & -\frac{\sqrt{385}i}{196} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2310}i}{147} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{231}i}{98} & 0 & \frac{\sqrt{11}i}{28} \\ -\frac{\sqrt{11}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{66}i}{77} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{385}i}{196} & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}i}{77} & 0 & \frac{\sqrt{154}i}{539} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{231}i}{98} & 0 & \frac{\sqrt{2310}i}{392} & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}i}{539} & 0 & -\frac{\sqrt{770}i}{539} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{77}i}{98} & 0 & \frac{\sqrt{154}i}{392} & 0 & 0 & 0 & 0 & \frac{\sqrt{770}i}{539} & 0 & -\frac{2\sqrt{462}i}{539} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{154}i}{392} & 0 & -\frac{\sqrt{77}i}{98} & 0 & 0 & 0 & 0 & \frac{2\sqrt{462}i}{539} & 0 & -\frac{\sqrt{770}i}{539} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2310}i}{392} & 0 & -\frac{\sqrt{231}i}{98} & 0 & 0 & 0 & 0 & \frac{\sqrt{770}i}{539} & 0 & \frac{\sqrt{154}i}{539} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{385}i}{196} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}i}{539} & 0 & \frac{\sqrt{66}i}{77} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}i}{77} & 0 \end{pmatrix}$
1011	symmetry	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{3,2}^{(1,1;a)}(E,1)$	$\begin{pmatrix} 0 & -\frac{\sqrt{2310}}{147} & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}}{28} & 0 & \frac{\sqrt{231}}{98} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2310}}{147} & 0 & \frac{\sqrt{231}}{147} & 0 & 0 & 0 & 0 & \frac{\sqrt{385}}{196} & 0 & \frac{\sqrt{77}}{98} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{231}}{147} & 0 & \frac{2\sqrt{462}}{147} & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{392} & 0 & -\frac{\sqrt{154}}{392} & 0 & 0 & 0 \\ 0 & 0 & \frac{2\sqrt{462}}{147} & 0 & \frac{\sqrt{231}}{147} & 0 & 0 & 0 & 0 & \frac{\sqrt{154}}{392} & 0 & -\frac{\sqrt{2310}}{392} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{231}}{147} & 0 & -\frac{\sqrt{2310}}{147} & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}}{98} & 0 & -\frac{\sqrt{385}}{196} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{147} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}}{98} & 0 & \frac{\sqrt{11}}{28} \\ -\frac{\sqrt{11}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{66}}{77} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{385}}{196} & 0 & 0 & 0 & 0 & \frac{\sqrt{66}}{77} & 0 & \frac{\sqrt{154}}{539} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{231}}{98} & 0 & \frac{\sqrt{2310}}{392} & 0 & 0 & 0 & 0 & \frac{\sqrt{154}}{539} & 0 & -\frac{\sqrt{770}}{539} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{77}}{98} & 0 & \frac{\sqrt{154}}{392} & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}}{539} & 0 & -\frac{2\sqrt{462}}{539} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{154}}{392} & 0 & -\frac{\sqrt{77}}{98} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{462}}{539} & 0 & -\frac{\sqrt{770}}{539} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2310}}{392} & 0 & -\frac{\sqrt{231}}{98} & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}}{539} & 0 & \frac{\sqrt{154}}{539} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{385}}{196} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}}{539} & 0 & \frac{\sqrt{66}}{77} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{11}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{66}}{77} & 0 \end{pmatrix}$
1012	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{3,1}^{(1,1;a)}(E,2)$	$\begin{bmatrix} 0 & 0 & \frac{5\sqrt{462}}{294} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}}{98} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2310}}{294} & 0 & 0 & \frac{\sqrt{22}}{28} & 0 & 0 & 0 & -\frac{\sqrt{770}}{196} & 0 & 0 & 0 \\ \frac{5\sqrt{462}}{294} & 0 & 0 & 0 & -\frac{\sqrt{2310}}{294} & 0 & 0 & \frac{\sqrt{77}}{196} & 0 & 0 & 0 & -\frac{\sqrt{231}}{196} & 0 & 0 \\ 0 & \frac{\sqrt{2310}}{294} & 0 & 0 & 0 & -\frac{5\sqrt{462}}{294} & 0 & 0 & -\frac{\sqrt{231}}{196} & 0 & 0 & 0 & \frac{\sqrt{77}}{196} & 0 \\ 0 & 0 & -\frac{\sqrt{2310}}{294} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}}{196} & 0 & 0 & 0 & \frac{\sqrt{22}}{28} \\ 0 & 0 & 0 & -\frac{5\sqrt{462}}{294} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}}{98} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{22}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{55}}{77} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{77}}{196} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{231}}{539} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{231}}{196} & 0 & 0 & -\frac{\sqrt{55}}{77} & 0 & 0 & 0 & -\frac{2\sqrt{77}}{539} & 0 & 0 & 0 \\ -\frac{\sqrt{154}}{98} & 0 & 0 & 0 & -\frac{\sqrt{770}}{196} & 0 & 0 & -\frac{3\sqrt{231}}{539} & 0 & 0 & 0 & \frac{2\sqrt{77}}{539} & 0 & 0 \\ 0 & -\frac{\sqrt{770}}{196} & 0 & 0 & 0 & -\frac{\sqrt{154}}{98} & 0 & 0 & -\frac{2\sqrt{77}}{539} & 0 & 0 & 0 & \frac{3\sqrt{231}}{539} & 0 \\ 0 & 0 & -\frac{\sqrt{231}}{196} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{77}}{539} & 0 & 0 & 0 & \frac{\sqrt{55}}{77} \\ 0 & 0 & 0 & \frac{\sqrt{77}}{196} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{231}}{539} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{55}}{77} & 0 & 0 \end{bmatrix}$
1013	symmetry	$\sqrt{15}xyz$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{3,2}^{(1,1;a)}(E,2)$	$\begin{pmatrix} 0 & 0 & \frac{5\sqrt{462}i}{294} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}i}{98} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2310}i}{294} & 0 & 0 & -\frac{\sqrt{22}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{770}i}{196} & 0 & 0 & 0 \\ -\frac{5\sqrt{462}i}{294} & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{294} & 0 & 0 & -\frac{\sqrt{77}i}{196} & 0 & 0 & 0 & -\frac{\sqrt{231}i}{196} & 0 & 0 \\ 0 & -\frac{\sqrt{2310}i}{294} & 0 & 0 & 0 & -\frac{5\sqrt{462}i}{294} & 0 & 0 & \frac{\sqrt{231}i}{196} & 0 & 0 & 0 & \frac{\sqrt{77}i}{196} & 0 \\ 0 & 0 & \frac{\sqrt{2310}i}{294} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{770}i}{196} & 0 & 0 & 0 & \frac{\sqrt{22}i}{28} \\ 0 & 0 & 0 & \frac{5\sqrt{462}i}{294} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}i}{98} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{22}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{55}i}{77} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{77}i}{196} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{231}i}{539} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{231}i}{196} & 0 & 0 & \frac{\sqrt{55}i}{77} & 0 & 0 & 0 & -\frac{2\sqrt{77}i}{539} & 0 & 0 & 0 \\ \frac{\sqrt{154}i}{98} & 0 & 0 & 0 & -\frac{\sqrt{770}i}{196} & 0 & 0 & \frac{3\sqrt{231}i}{539} & 0 & 0 & 0 & \frac{2\sqrt{77}i}{539} & 0 & 0 \\ 0 & \frac{\sqrt{770}i}{196} & 0 & 0 & 0 & -\frac{\sqrt{154}i}{98} & 0 & 0 & \frac{2\sqrt{77}i}{539} & 0 & 0 & 0 & \frac{3\sqrt{231}i}{539} & 0 \\ 0 & 0 & \frac{\sqrt{231}i}{196} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{77}i}{539} & 0 & 0 & 0 & \frac{\sqrt{55}i}{77} \\ 0 & 0 & 0 & -\frac{\sqrt{77}i}{196} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{231}i}{539} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{22}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{55}i}{77} & 0 & 0 \end{pmatrix}$
1014	symmetry	$-\frac{\sqrt{70}x\left(x^2-3y^2\right)\left(x^2+y^2-8z^2\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(1,1;a)}(A_1)$	$\begin{pmatrix} 0 & 0 & 0 & \frac{2\sqrt{143}}{77} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{429}}{924} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{1430}}{77} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{143}}{308} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{143}}{77} & \frac{\sqrt{6006}}{924} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{858}}{308} & 0 \\ \frac{2\sqrt{143}}{77} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{858}}{308} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6006}}{924} \\ 0 & -\frac{\sqrt{1430}}{77} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{143}}{308} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{2\sqrt{143}}{77} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{429}}{924} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6006}}{924} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2002}}{1001} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{858}}{308} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{286}}{2002} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{143}}{308} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1430}}{1001} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{429}}{924} & -\frac{\sqrt{2002}}{1001} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{286}}{2002} & 0 \\ -\frac{5\sqrt{429}}{924} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{286}}{2002} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2002}}{1001} \\ 0 & \frac{\sqrt{143}}{308} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1430}}{1001} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{858}}{308} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{286}}{2002} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6006}}{924} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2002}}{1001} & 0 & 0 & 0 \end{pmatrix}$
1015	symmetry	$\frac{z\left(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(1,1;a)}(A_2,1)$	$\begin{pmatrix} \frac{\sqrt{1001}}{539} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6006}}{6468} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{1001}}{539} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10010}}{2156} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{10\sqrt{1001}}{539} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{3003}}{3234} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{10\sqrt{1001}}{539} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{3003}}{3234} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{5\sqrt{1001}}{539} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10010}}{2156} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1001}}{539} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6006}}{6468} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1001}}{2002} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{5\sqrt{6006}}{6468} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{23\sqrt{1001}}{14014} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{10010}}{2156} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{17\sqrt{1001}}{14014} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{3003}}{3234} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{15\sqrt{1001}}{14014} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{3003}}{3234} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{15\sqrt{1001}}{14014} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{10010}}{2156} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{17\sqrt{1001}}{14014} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6006}}{6468} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{23\sqrt{1001}}{14014} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1001}}{2002} \end{pmatrix}$
1016	symmetry	$-\frac{\sqrt{70}y\left(3x^2-y^2\right)\left(x^2+y^2-8z^2\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(1,1;a)}(A_2,2)$	$\begin{pmatrix} 0 & 0 & 0 & -\frac{2\sqrt{143}i}{77} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{429}i}{924} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{1430}i}{77} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{143}i}{308} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{143}i}{77} & \frac{\sqrt{6006}i}{924} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{858}i}{308} & 0 \\ \frac{2\sqrt{143}i}{77} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{858}i}{308} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6006}i}{924} \\ 0 & -\frac{\sqrt{1430}i}{77} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{143}i}{308} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{2\sqrt{143}i}{77} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{429}i}{924} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6006}i}{924} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2002}i}{1001} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{858}i}{308} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{286}i}{2002} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{143}i}{308} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1430}i}{1001} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{429}i}{924} & -\frac{\sqrt{2002}i}{1001} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{286}i}{2002} & 0 \\ -\frac{5\sqrt{429}i}{924} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{286}i}{2002} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2002}i}{1001} \\ 0 & \frac{\sqrt{143}i}{308} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1430}i}{1001} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{858}i}{308} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{286}i}{2002} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6006}i}{924} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2002}i}{1001} & 0 & 0 & 0 \end{pmatrix}$
1017	symmetry	$\frac{3\sqrt{14}y\left(5x^4-10x^2y^2+y^4\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{5,1}^{(1,1;a)}(E,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{286}i}{77} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{429}i}{924} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15015}i}{924} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15015}i}{924} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{286}i}{77} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{429}i}{924} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15015}i}{924} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6006}i}{2002} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{429}i}{924} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{286}i}{1001} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6006}i}{2002} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6006}i}{2002} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{5\sqrt{429}i}{924} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{286}i}{1001} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15015}i}{924} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6006}i}{2002} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
1018	symmetry	$\frac{3\sqrt{14}x\left(x^4-10x^2y^2+5y^4\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{5,2}^{(1,1;a)}(E,1)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{286}}{77} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{429}}{924} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15015}}{924} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15015}}{924} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{286}}{77} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{429}}{924} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15015}}{924} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6006}}{2002} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{429}}{924} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{286}}{1001} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6006}}{2002} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6006}}{2002} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{5\sqrt{429}}{924} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{286}}{1001} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15015}}{924} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6006}}{2002} & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
1019	symmetry	$-\frac{\sqrt{15}y\left(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{5,1}^{(1,1;a)}(E,2)$	$\begin{bmatrix} 0 & \frac{\sqrt{3003}i}{539} & 0 & 0 & 0 & 0 & -\frac{\sqrt{1430}i}{1848} & 0 & -\frac{5\sqrt{30030}i}{12936} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{3003}i}{539} & 0 & -\frac{\sqrt{30030}i}{539} & 0 & 0 & 0 & 0 & \frac{23\sqrt{2002}i}{12936} & 0 & \frac{13\sqrt{10010}i}{12936} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30030}i}{539} & 0 & \frac{2\sqrt{15015}i}{539} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3003}i}{588} & 0 & -\frac{\sqrt{5005}i}{6468} & 0 & 0 & 0 \\ 0 & 0 & -\frac{2\sqrt{15015}i}{539} & 0 & -\frac{\sqrt{30030}i}{539} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5005}i}{6468} & 0 & -\frac{\sqrt{3003}i}{588} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30030}i}{539} & 0 & \frac{\sqrt{3003}i}{539} & 0 & 0 & 0 & 0 & \frac{13\sqrt{10010}i}{12936} & 0 & \frac{23\sqrt{2002}i}{12936} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3003}i}{539} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{30030}i}{12936} & 0 & -\frac{\sqrt{1430}i}{1848} \\ \frac{\sqrt{1430}i}{1848} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2145}i}{2002} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{23\sqrt{2002}i}{12936} & 0 & 0 & 0 & 0 & \frac{\sqrt{2145}i}{2002} & 0 & \frac{4\sqrt{5005}i}{7007} & 0 & 0 & 0 & 0 & 0 \\ \frac{5\sqrt{30030}i}{12936} & 0 & \frac{\sqrt{3003}i}{588} & 0 & 0 & 0 & 0 & -\frac{4\sqrt{5005}i}{7007} & 0 & -\frac{\sqrt{1001}i}{14014} & 0 & 0 & 0 & 0 \\ 0 & -\frac{13\sqrt{10010}i}{12936} & 0 & \frac{\sqrt{5005}i}{6468} & 0 & 0 & 0 & 0 & \frac{\sqrt{1001}i}{14014} & 0 & -\frac{2\sqrt{15015}i}{7007} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5005}i}{6468} & 0 & -\frac{13\sqrt{10010}i}{12936} & 0 & 0 & 0 & 0 & \frac{2\sqrt{15015}i}{7007} & 0 & -\frac{\sqrt{1001}i}{14014} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3003}i}{588} & 0 & \frac{5\sqrt{30030}i}{12936} & 0 & 0 & 0 & 0 & \frac{\sqrt{1001}i}{14014} & 0 & \frac{4\sqrt{5005}i}{7007} & 0 \\ 0 & 0 & 0 & 0 & -\frac{23\sqrt{2002}i}{12936} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{4\sqrt{5005}i}{7007} & 0 & -\frac{\sqrt{2145}i}{2002} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1430}i}{1848} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2145}i}{2002} & 0 \end{bmatrix}$
1020	symmetry	$\frac{\sqrt{15}x\left(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{5,2}^{(1,1;a)}(E,2)$	$\begin{pmatrix} 0 & \frac{\sqrt{3003}}{539} & 0 & 0 & 0 & 0 & \frac{\sqrt{1430}}{1848} & 0 & -\frac{5\sqrt{30030}}{12936} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{3003}}{539} & 0 & -\frac{\sqrt{30030}}{539} & 0 & 0 & 0 & 0 & -\frac{23\sqrt{2002}}{12936} & 0 & \frac{13\sqrt{10010}}{12936} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30030}}{539} & 0 & \frac{2\sqrt{15015}}{539} & 0 & 0 & 0 & 0 & \frac{\sqrt{3003}}{588} & 0 & -\frac{\sqrt{5005}}{6468} & 0 & 0 & 0 \\ 0 & 0 & \frac{2\sqrt{15015}}{539} & 0 & -\frac{\sqrt{30030}}{539} & 0 & 0 & 0 & 0 & \frac{\sqrt{5005}}{6468} & 0 & -\frac{\sqrt{3003}}{588} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30030}}{539} & 0 & \frac{\sqrt{3003}}{539} & 0 & 0 & 0 & 0 & -\frac{13\sqrt{10010}}{12936} & 0 & \frac{23\sqrt{2002}}{12936} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3003}}{539} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{30030}}{12936} & 0 & -\frac{\sqrt{1430}}{1848} \\ \frac{\sqrt{1430}}{1848} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2145}}{2002} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{23\sqrt{2002}}{12936} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2145}}{2002} & 0 & \frac{4\sqrt{5005}}{7007} & 0 & 0 & 0 & 0 & 0 \\ -\frac{5\sqrt{30030}}{12936} & 0 & \frac{\sqrt{3003}}{588} & 0 & 0 & 0 & 0 & \frac{4\sqrt{5005}}{7007} & 0 & -\frac{\sqrt{1001}}{14014} & 0 & 0 & 0 & 0 \\ 0 & \frac{13\sqrt{10010}}{12936} & 0 & \frac{\sqrt{5005}}{6468} & 0 & 0 & 0 & 0 & -\frac{\sqrt{1001}}{14014} & 0 & -\frac{2\sqrt{15015}}{7007} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5005}}{6468} & 0 & -\frac{13\sqrt{10010}}{12936} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15015}}{7007} & 0 & -\frac{\sqrt{1001}}{14014} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3003}}{588} & 0 & \frac{5\sqrt{30030}}{12936} & 0 & 0 & 0 & 0 & -\frac{\sqrt{1001}}{14014} & 0 & \frac{4\sqrt{5005}}{7007} & 0 \\ 0 & 0 & 0 & 0 & \frac{23\sqrt{2002}}{12936} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{4\sqrt{5005}}{7007} & 0 & -\frac{\sqrt{2145}}{2002} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1430}}{1848} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2145}}{2002} & 0 \end{pmatrix}$
1021	symmetry	$-\frac{3\sqrt{35}z\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{5,1}^{(1,1;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{3\sqrt{143}}{77} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1430}}{308} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{143}}{77} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{858}}{924} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3003}}{462} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3003}}{462} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{143}}{77} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{858}}{924} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{143}}{77} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1430}}{308} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3003}}{462} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{1001}}{2002} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{858}}{924} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2145}}{2002} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1430}}{308} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2145}}{2002} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{1001}}{2002} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{1001}}{2002} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{1430}}{308} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2145}}{2002} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{858}}{924} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2145}}{2002} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3003}}{462} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{1001}}{2002} & 0 & 0 & 0 & 0 \end{bmatrix}$
1022	symmetry	$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{5,2}^{(1,1;a)}(E,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{3\sqrt{143}i}{77} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1430}i}{308} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{143}i}{77} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{858}i}{924} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3003}i}{462} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3003}i}{462} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{143}i}{77} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{858}i}{924} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{143}i}{77} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1430}i}{308} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3003}i}{462} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{1001}i}{2002} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{858}i}{924} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2145}i}{2002} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1430}i}{308} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2145}i}{2002} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{1001}i}{2002} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{1001}i}{2002} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{1430}i}{308} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2145}i}{2002} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{858}i}{924} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2145}i}{2002} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3003}i}{462} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{1001}i}{2002} & 0 & 0 & 0 & 0 \end{bmatrix}$
1023	symmetry	$\frac{\sqrt{105}z(x-y)(x+y)\left(x^2+y^2-2z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{5,1}^{(1,1;a)}(E,4)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{858}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{286}}{924} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{4290}}{154} & 0 & 0 & -\frac{\sqrt{2002}}{924} & 0 & 0 & 0 & -\frac{\sqrt{1430}}{462} & 0 & 0 & 0 \\ -\frac{\sqrt{858}}{154} & 0 & 0 & 0 & -\frac{\sqrt{4290}}{154} & 0 & 0 & \frac{2\sqrt{143}}{231} & 0 & 0 & 0 & -\frac{\sqrt{429}}{462} & 0 & 0 \\ 0 & \frac{\sqrt{4290}}{154} & 0 & 0 & 0 & \frac{\sqrt{858}}{154} & 0 & 0 & -\frac{\sqrt{429}}{462} & 0 & 0 & 0 & \frac{2\sqrt{143}}{231} & 0 \\ 0 & 0 & -\frac{\sqrt{4290}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1430}}{462} & 0 & 0 & 0 & -\frac{\sqrt{2002}}{924} \\ 0 & 0 & 0 & \frac{\sqrt{858}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{286}}{924} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2002}}{924} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5005}}{2002} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{2\sqrt{143}}{231} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{429}}{2002} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{429}}{462} & 0 & 0 & \frac{\sqrt{5005}}{2002} & 0 & 0 & 0 & -\frac{2\sqrt{143}}{1001} & 0 & 0 & 0 \\ \frac{5\sqrt{286}}{924} & 0 & 0 & 0 & -\frac{\sqrt{1430}}{462} & 0 & 0 & -\frac{3\sqrt{429}}{2002} & 0 & 0 & 0 & \frac{2\sqrt{143}}{1001} & 0 & 0 \\ 0 & -\frac{\sqrt{1430}}{462} & 0 & 0 & 0 & \frac{5\sqrt{286}}{924} & 0 & 0 & -\frac{2\sqrt{143}}{1001} & 0 & 0 & 0 & \frac{3\sqrt{429}}{2002} & 0 \\ 0 & 0 & -\frac{\sqrt{429}}{462} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{143}}{1001} & 0 & 0 & 0 & -\frac{\sqrt{5005}}{2002} \\ 0 & 0 & 0 & \frac{2\sqrt{143}}{231} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{429}}{2002} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2002}}{924} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5005}}{2002} & 0 & 0 \end{bmatrix}$
1024	symmetry	$-\frac{\sqrt{105}xyz\left(x^2+y^2-2z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{5,2}^{(1,1;a)}(E,4)$	$\begin{matrix} 0 & 0 & -\frac{\sqrt{858}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{286}i}{924} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{4290}i}{154} & 0 & 0 & \frac{\sqrt{2002}i}{924} & 0 & 0 & 0 & -\frac{\sqrt{1430}i}{462} & 0 & 0 & 0 \\ \frac{\sqrt{858}i}{154} & 0 & 0 & 0 & -\frac{\sqrt{4290}i}{154} & 0 & 0 & -\frac{2\sqrt{143}i}{231} & 0 & 0 & 0 & -\frac{\sqrt{429}i}{462} & 0 & 0 \\ 0 & -\frac{\sqrt{4290}i}{154} & 0 & 0 & 0 & \frac{\sqrt{858}i}{154} & 0 & 0 & \frac{\sqrt{429}i}{462} & 0 & 0 & 0 & \frac{2\sqrt{143}i}{231} & 0 \\ 0 & 0 & \frac{\sqrt{4290}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1430}i}{462} & 0 & 0 & 0 & -\frac{\sqrt{2002}i}{924} \\ 0 & 0 & 0 & -\frac{\sqrt{858}i}{154} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{286}i}{924} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2002}i}{924} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5005}i}{2002} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{2\sqrt{143}i}{231} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{429}i}{2002} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{429}i}{462} & 0 & 0 & -\frac{\sqrt{5005}i}{2002} & 0 & 0 & 0 & -\frac{2\sqrt{143}i}{1001} & 0 & 0 & 0 \\ -\frac{5\sqrt{286}i}{924} & 0 & 0 & 0 & -\frac{\sqrt{1430}i}{462} & 0 & 0 & \frac{3\sqrt{429}i}{2002} & 0 & 0 & 0 & \frac{2\sqrt{143}i}{1001} & 0 & 0 \\ 0 & \frac{\sqrt{1430}i}{462} & 0 & 0 & 0 & \frac{5\sqrt{286}i}{924} & 0 & 0 & \frac{2\sqrt{143}i}{1001} & 0 & 0 & 0 & \frac{3\sqrt{429}i}{2002} & 0 \\ 0 & 0 & \frac{\sqrt{429}i}{462} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{143}i}{1001} & 0 & 0 & 0 & -\frac{\sqrt{5005}i}{2002} \\ 0 & 0 & 0 & -\frac{2\sqrt{143}i}{231} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{429}i}{2002} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2002}i}{924} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5005}i}{2002} & 0 & 0 \end{matrix}$